

2-4 地化学探査

(1) 河床堆積物パンニング試料による地化学探査

この探査は、モンバサ地域内の広域的な鉱物資源ポテンシャルを評価することを目的として実施した。河床堆積物パンニング試料は、本地域全域（面積約 9,000km²）から 100試料採取した。

フィールド作業

試料採取場所は、フィールド作業開始前に、パンニング試料採取に適した場所を選択し、縮尺 1 : 250,000 地形図上にプロットされた。試料は全ての主要な主流、及び主な支流の主流との合流地点付近で採取した。パンニング試料は川砂を標準的な砂金パンニング法で半濃縮し、原則として 20cc 集められた。集めた試料は天日乾燥し、分析ラボへ送付した。試料採取率は河川へのアクセスの悪さから 4 試料 / チーム / 日、以下であった。

室内作業

鉱物同定

実体鏡下での鉱物同定のため、色・多色性・形態・光学的方位・屈折率・複屈折率・干渉像など鉱物学的特性を利用した。代表的鉱物の同定を目的として、一部の試料について X 線回折分析を実施した。

地化学分析

採取した試料は、地化学分析のため、Chemex Labs Ltd., Canadaへ送られた。同地で試料は乾燥後、-150 メッシュに粉砕された。河床堆積物パンニング試料の分析は次の 14 元素について行った； Au, Ag, Cu, Pb, Zn, Ba, Mn, Fe, S, U, Th, Pt, P, 及び Hg 試料は、まず、Nitric-Aqua Regia Digestion 処理された。14 元素のうち、次の 9 元素 Cu, Pb, Zn, Ba, Mn, Fe, U, P, 及び Hg については、ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) で、Au 及び Pt については、FA-ICP-AFS (Fire Assay-ICP-Atomic Fluorescence Spectrometry) で、Ag は AAS (Atomic Absorption Spectroscopy), そして Th は NNA (Neutron Activation Analysis) で、それぞれ、測定された。さらに、S は Leco Induction Furnace-IR Detector を使用して測定された。

結果及び検討

河床堆積物パンニング試料は、次の 14 元素について地化学分析された； Au, Ag, Pb, Zn, Ba, Mn, Fe, S, U, Th, Pt, P 及び Hg。このうち、U は全試料について検出限界 (10ppm) 以下を示しているため、統計処理の意味はないので下記の記載から除外する。その他の元素についての結果を以下に要約する。

金： 試料の大半（約70%）は1 ppb Au（検出限界）以下を示した。累積頻度分布図から、しきい値として6 ppb を選んだ。その結果、金の異常値は、Figure GC-2 に示すとおり4ヶ所にある。

銀： 試料の98%近くが0.2ppm Ag(検出限界)以下を示した。従って、統計上殆ど意味はない。検出限界以上の値を示す2試料は、Figure GC-2 に示すとおり、Vitengeni 鉛（重晶石）鉱山近くに位置している。

銅： Cu値は、1 ppm 以下から50ppm まで変動し、頻度分布は多峰型で、二つ以上の母集団からなるものとみられる。この解析では、20ppm Cu以上の異常、7~20ppm Cuの異常に分割し、Figure GC-2 に示した。

鉛： 試料の大半（95%以上）は、2 ppm Pb（検出限界）以下から10,100ppm Pbまで変動し、二つ以上の母集団からなる。100 試料中、3 試料が著しく高い値、400, 3,000及び 10,000ppm Pbを示した。これらの試料は Vitengeni鉱山及び Kinangoni鉱山付近で採取された（Figure GC-2）。

亜鉛： Zn値は2 ppm Zn（検出限界）以下から 234ppm Znまで変動する。母集団は頻度分布図上、多峰型であるが、累積頻度分布図上、ほぼ直線を示す。しかし、この解析では、図上の微小な屈折点から、35ppm Zn及び 150ppm Pbをしきい値に選んだ。それぞれの異常値の分布を Figure GC-2に示した。

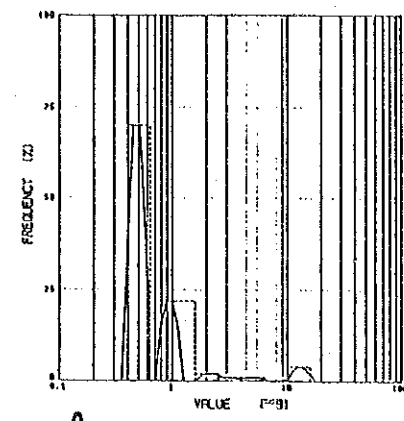
バリウム： Ba値の母集団は、明瞭に3つの主要母集団からなる。500ppm Ba以下の母集団は広域的なバックグラウンド母集団を代表しているものとみられる。500 ~3,000ppm Ba は広域的な意味では異常母集団とみられるが、それらの図上の分布は、今後の探査ターゲット地区を抽出するには広すぎる。3,000ppm Ba だけが、この解析では異常母集団とみられる。これらの異常値は Vitengeni及び Kinangoni既知鉱山付近、その他に分布している（Figure GC-2）。

マンガン： Mn値の母集団は、複合母集団からなるとみられるが、バリウム値の場合のように明確ではない。Kinangoni 北方で採取した1 試料だけが 5,000ppm Mnを越える。

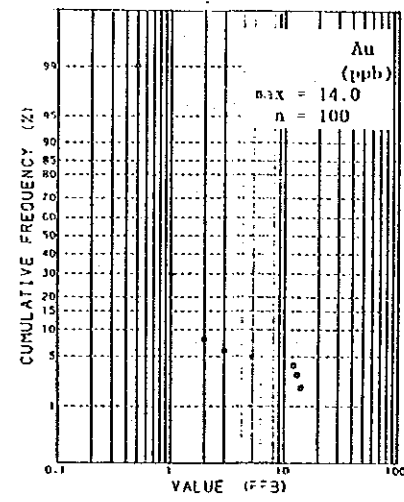
鉄： 河床堆積物中のFe含有量は、0.36%Feから15%まで変動する。頻度分布パターンは、いくつかの異なった母集団からなっていることを示唆している。しかしそれらの識別は困難である。この解析では、累積頻度分布図上の微小な屈折点から、9%をしきい値とした。本地域の西部で採取した3 試料だけが異常値を示した（Figure GC-2）

硫黄： 試料中のS含有量は 0.004~5.450 %で変動する。しかし、試料の大半（約95%は0.2 % S以下である。S値の頻度分布は正の非対称性をもつ対数正規分布を示す。0.08%付近の第2屈折点がいしきい値を示すものとみられる。この解析では、2, 0.3及び0.08%をそれぞれ、第1, 第2, 及び第3しきい値にえらんだ（Figure GC-1）S異常値は、主として、Mangea-Kwa Dadu と Kinangoni間に分布している（Figure GC-2）。

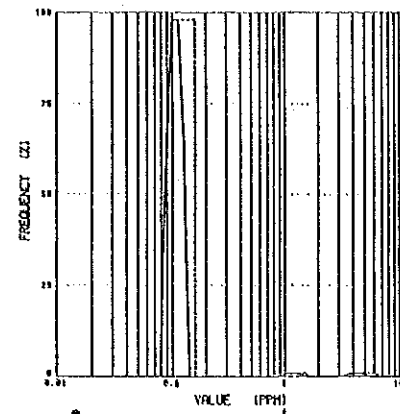
トリウム： 試料中のTh含有量は、2 ~1.308ppm Th で変動し、試料の約40%以上が100ppm Thを示している。頻度分布パターンは、多数の異なる母集団からなっていることを示唆している。この解析では、750, 150, 及び50ppm のTh値をしきい値とし、第1, 第2, 第3異常及び



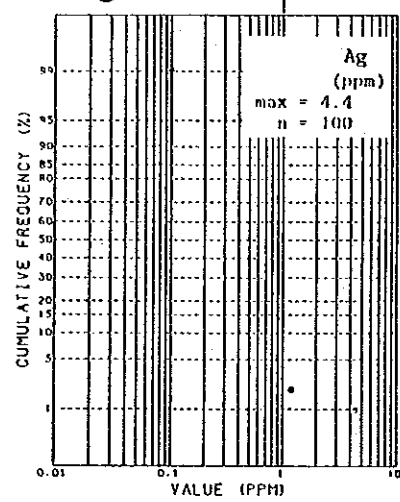
Au • 5ppb •



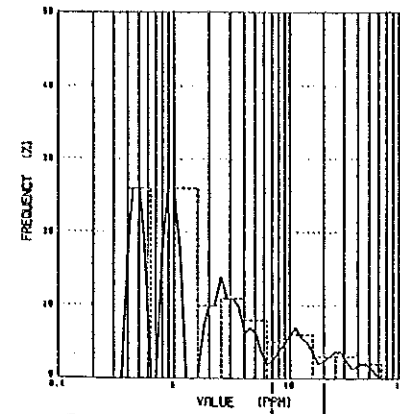
Au (ppb)
max = 14.0
n = 100



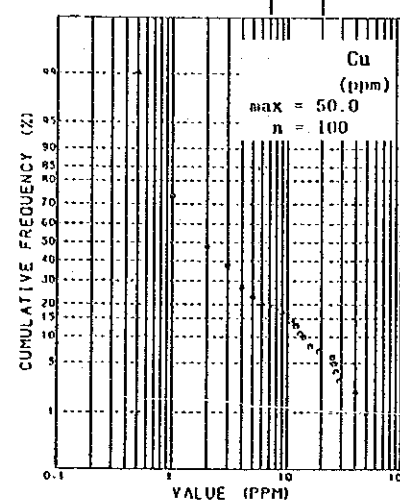
Ag • 1ppm •



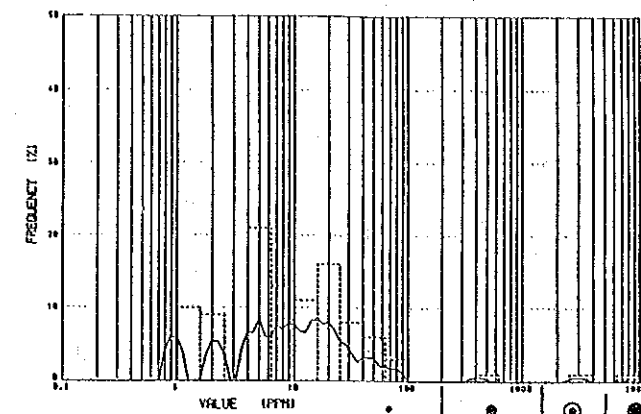
Ag (ppm)
max = 4.4
n = 100



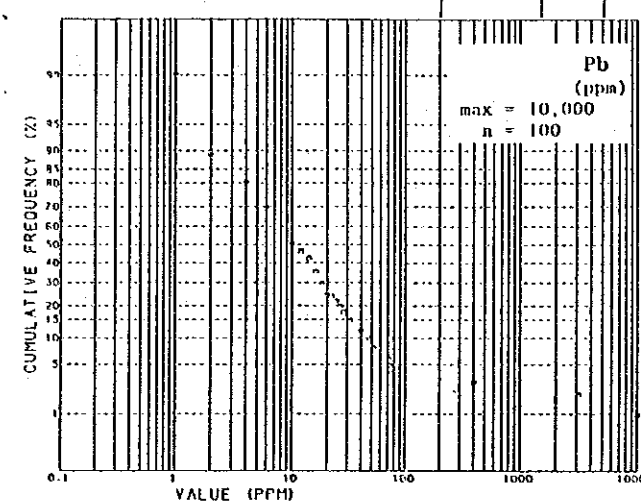
Cu • 7 • 20ppm •



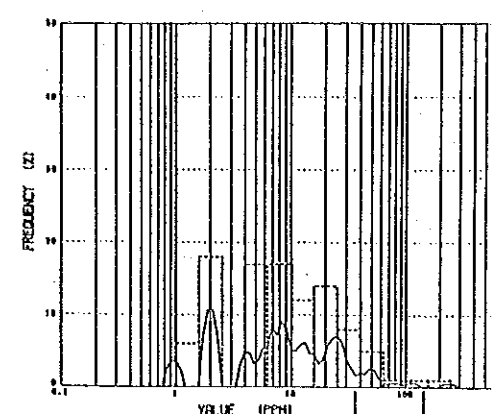
Cu (ppm)
max = 50.0
n = 100



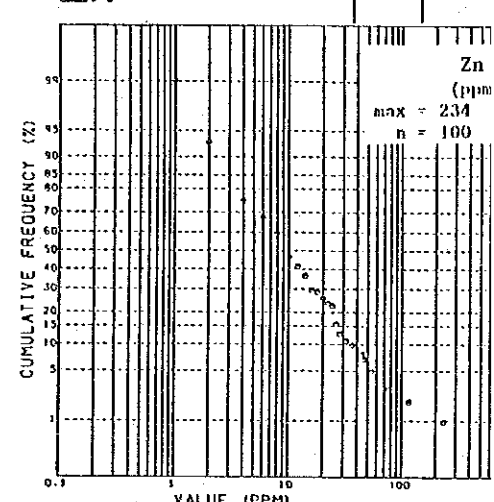
Pb • 200ppm • 1,500 • 5,000 •



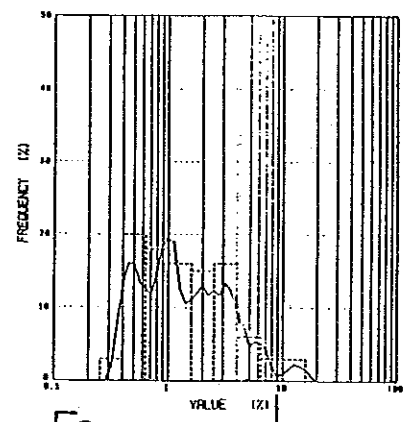
Pb (ppm)
max = 10,000
n = 100



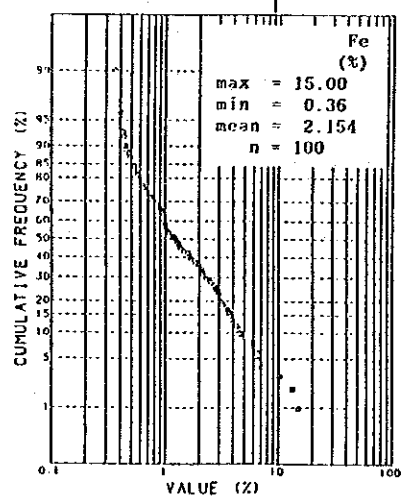
Zn • 35 • 150ppm •



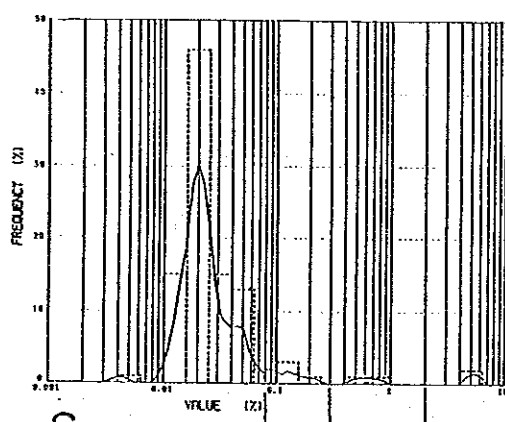
Zn (ppm)
max = 234
n = 100



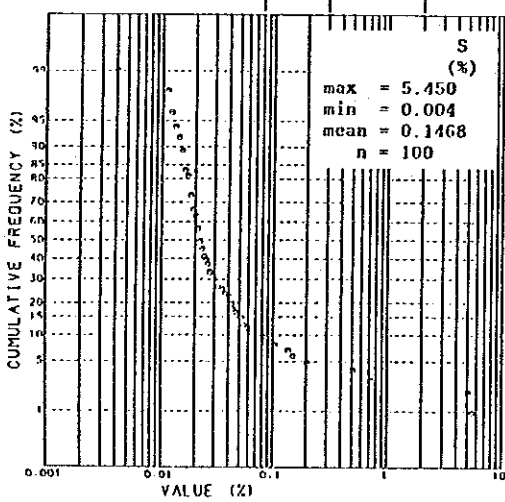
Fe • 9% •



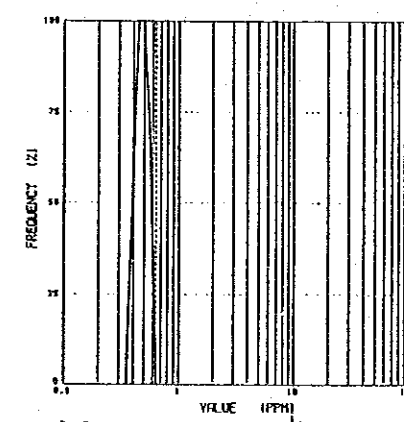
Fe (%)
max = 15.00
min = 0.36
mean = 2.154
n = 100



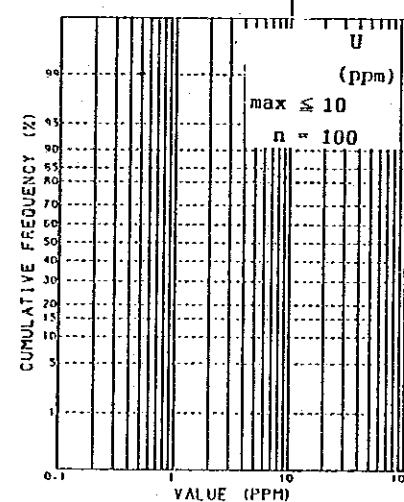
S • 0.05 • 0.3 • 2% •



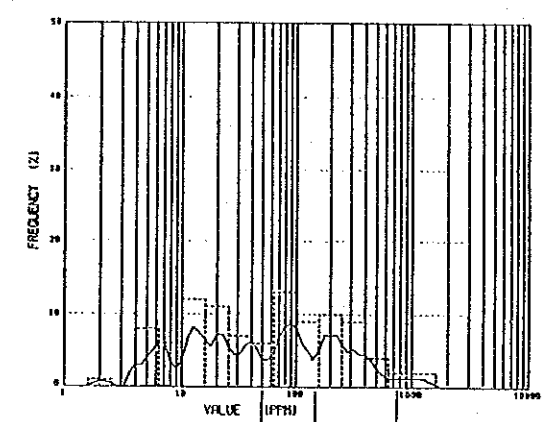
S (%)
max = 5.450
min = 0.004
mean = 0.1468
n = 100



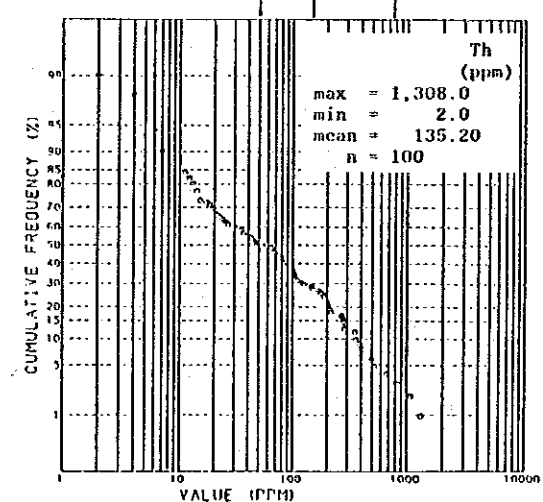
U • 10ppm •



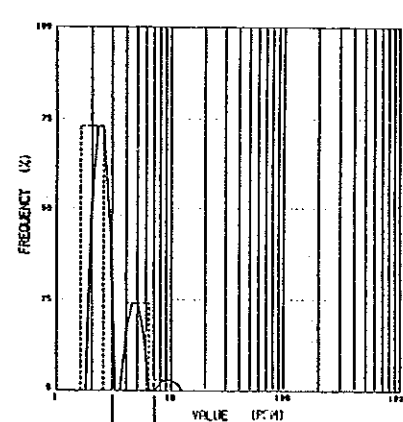
U (ppm)
max = 10
n = 100



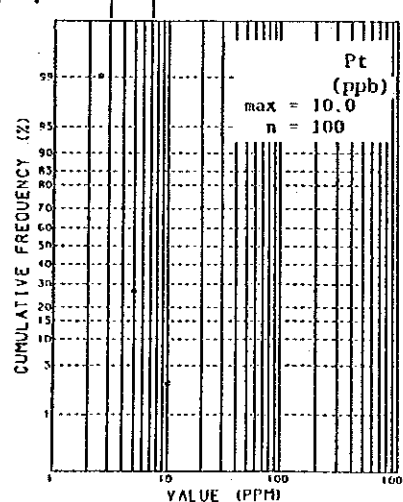
Th • 50 • 150 • 750ppm •



Th (ppm)
max = 1,308.0
min = 2.0
mean = 135.20
n = 100

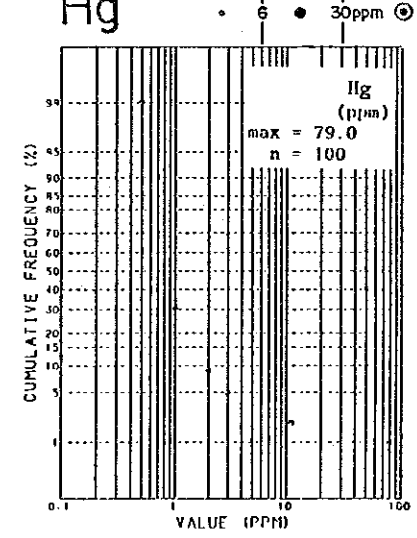
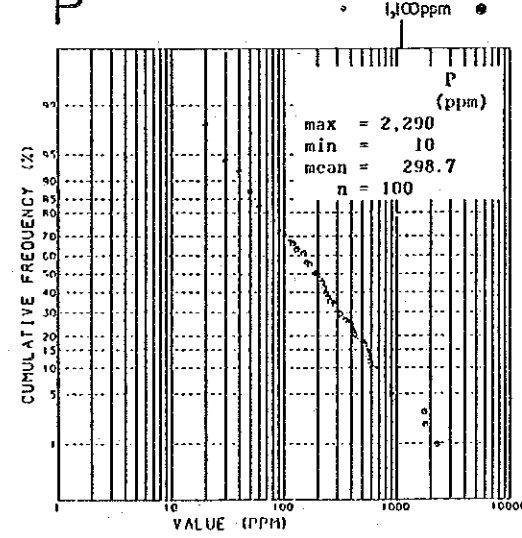
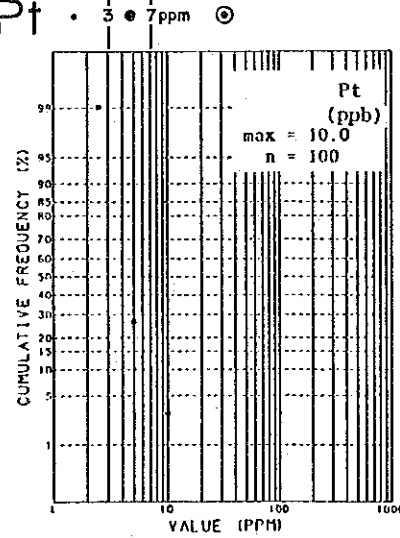
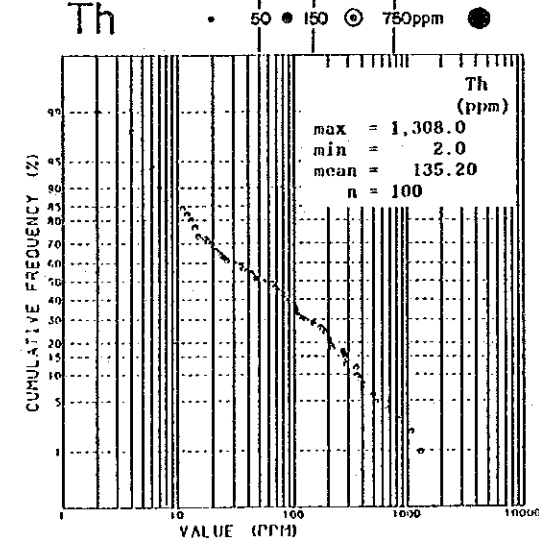
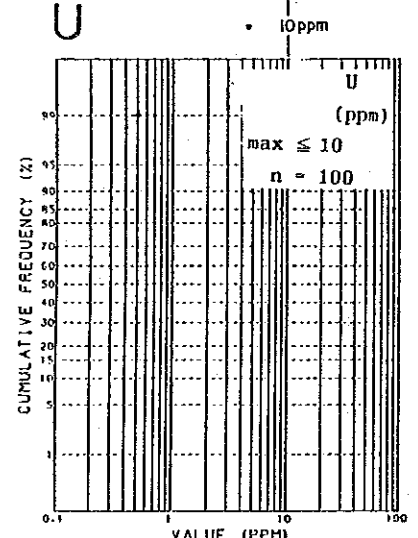
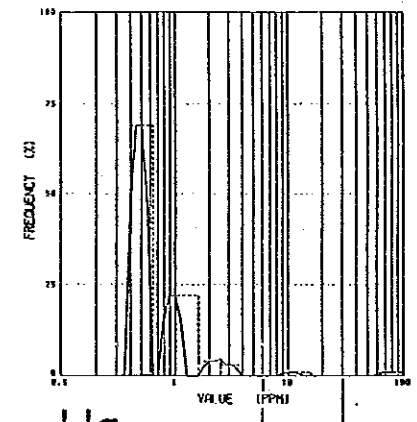
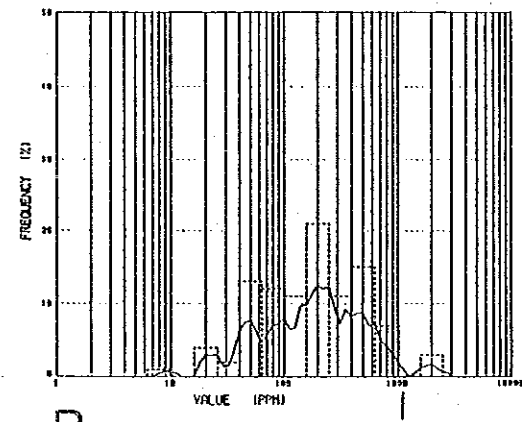
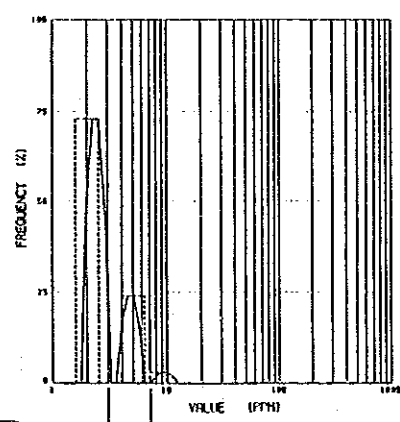
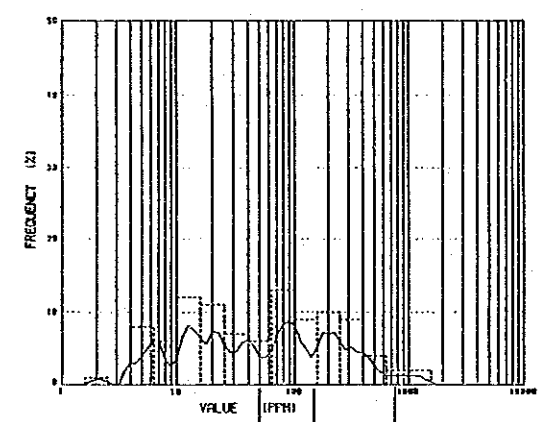
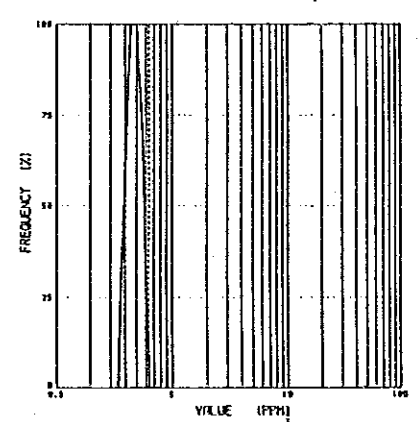
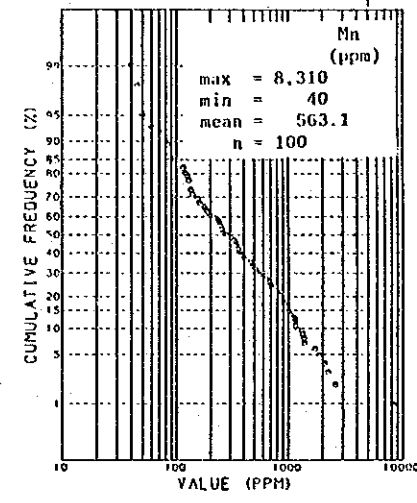
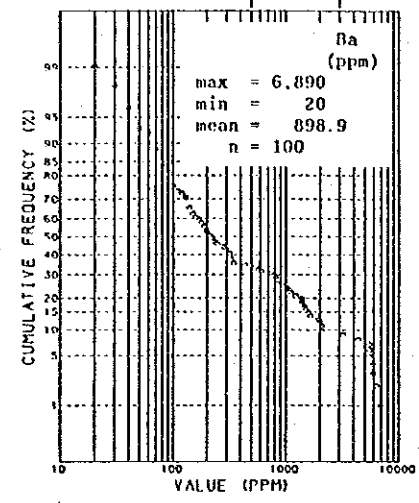
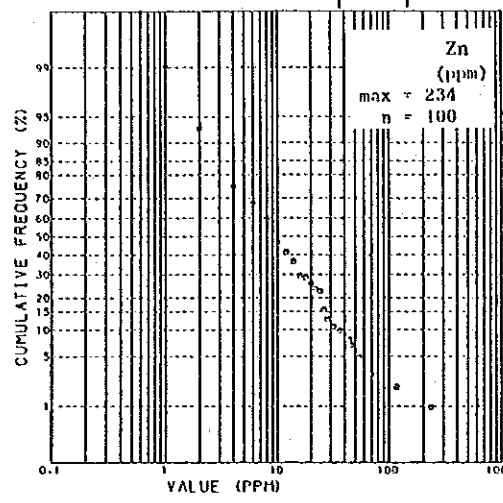
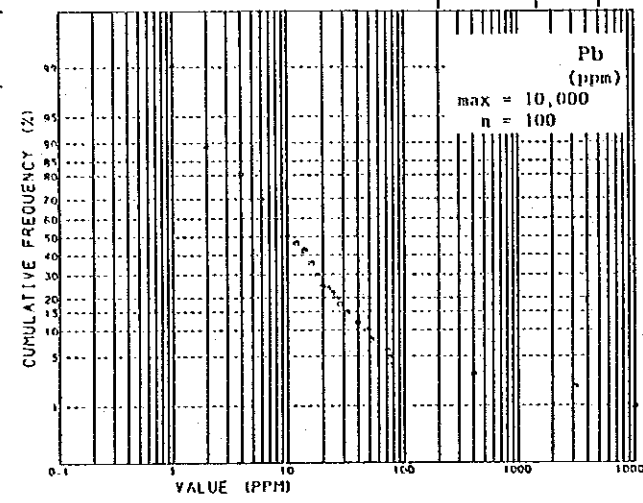
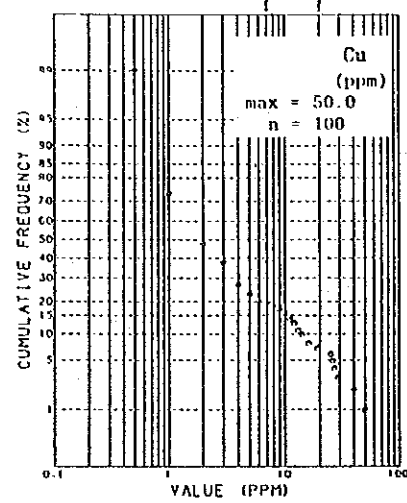
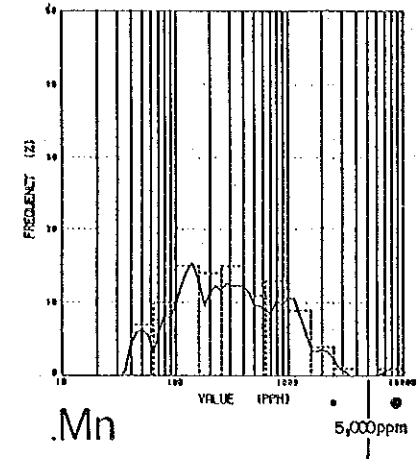
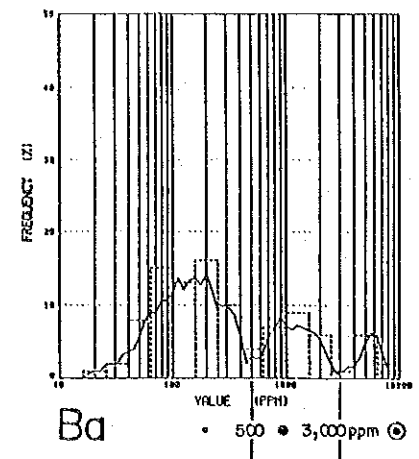
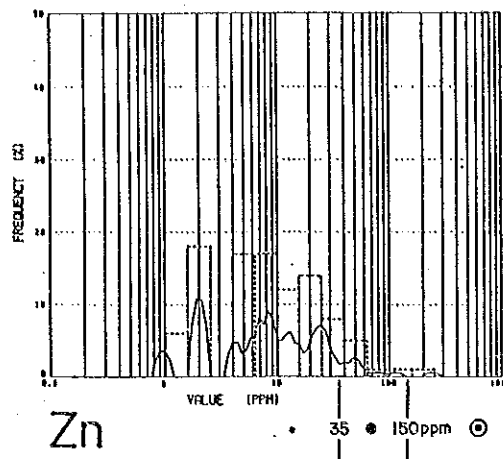
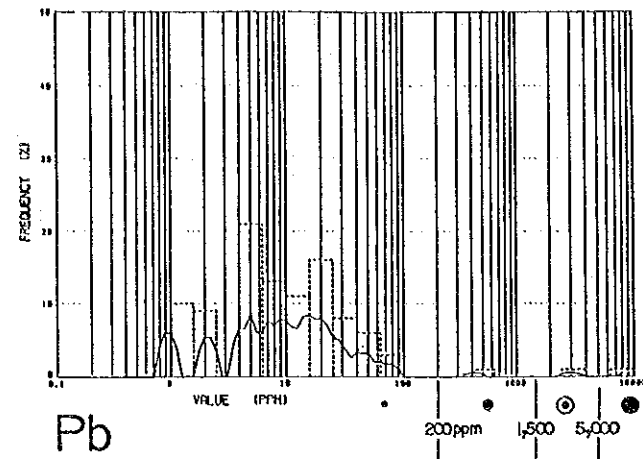
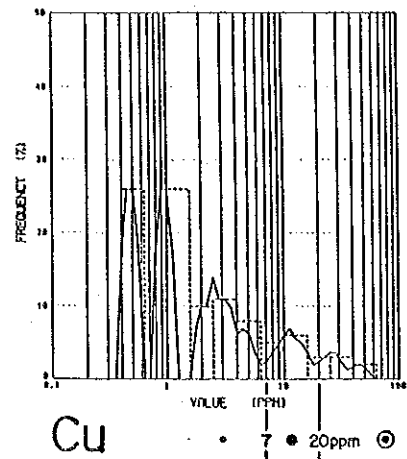


Pt • 3 • 7ppm •

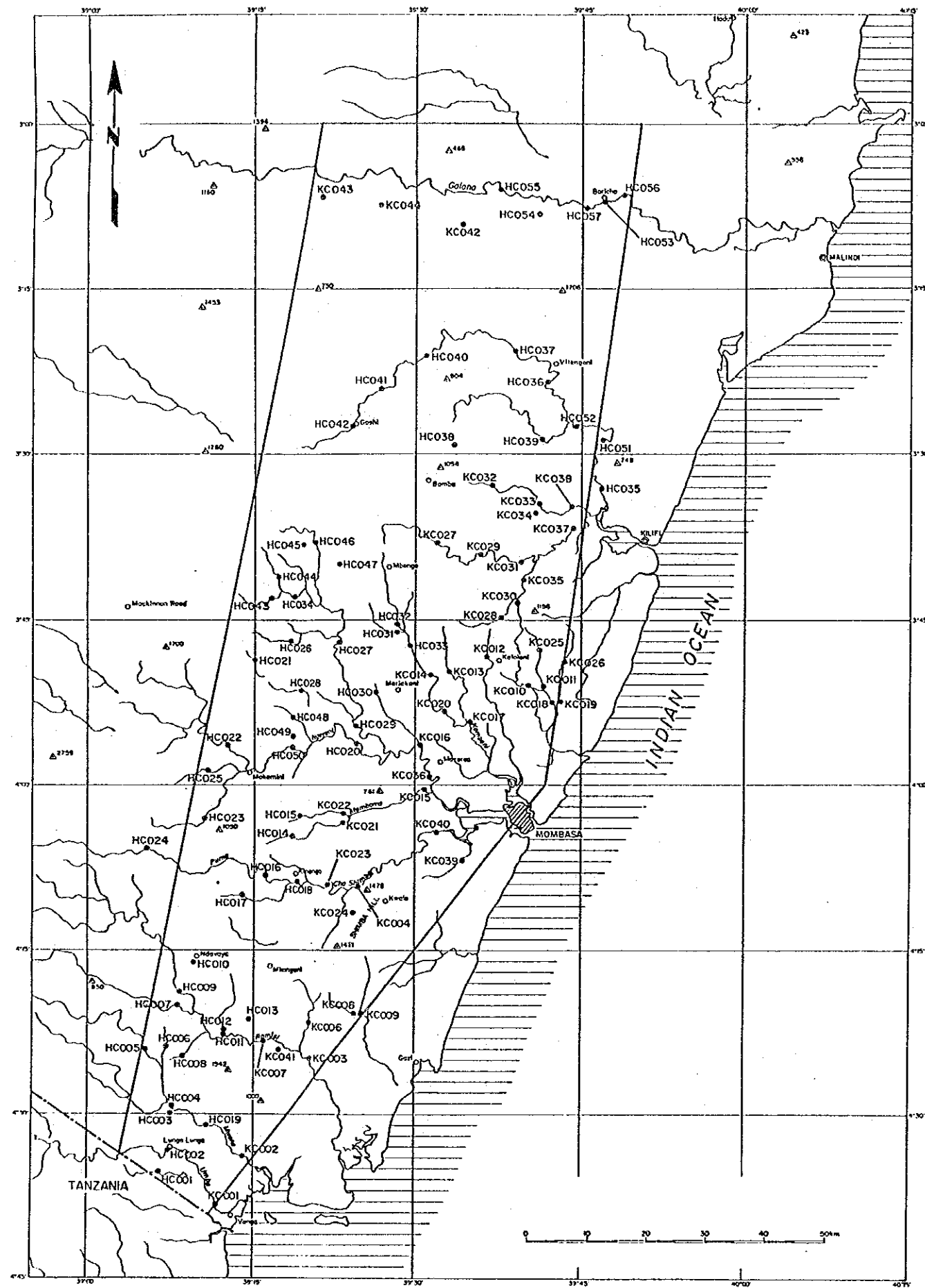


Pt (ppb)
max = 10.0
n = 100

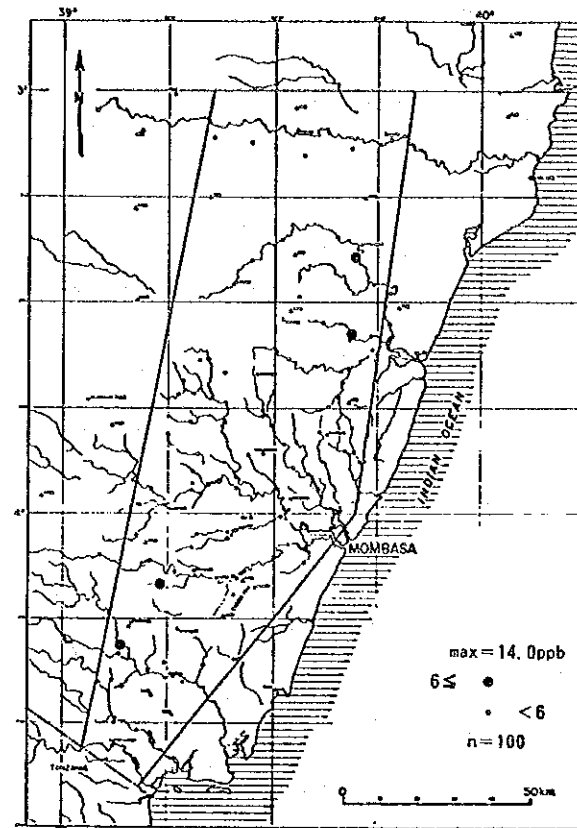
Figure GC-1 Frequency distribution and cumulative frequency distribution of 14 selected elements in pan-concentrated s



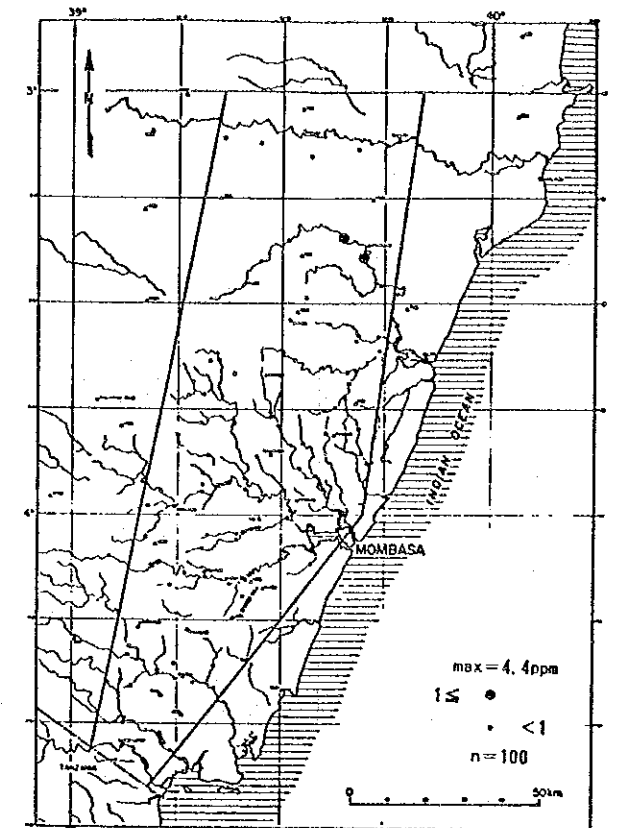
ution and cumulative frequency distribution of 14 selected elements in pan-concentrated stream sediments from the Mombasa area



Au



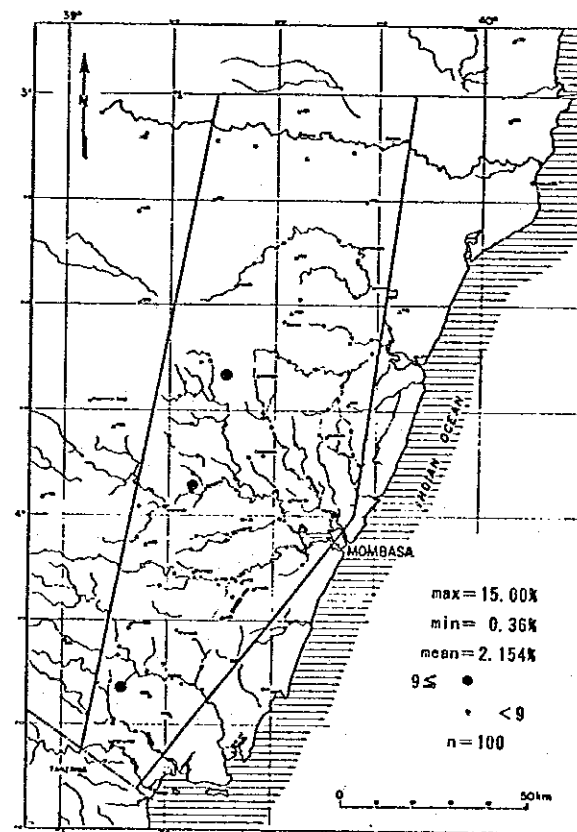
Ag



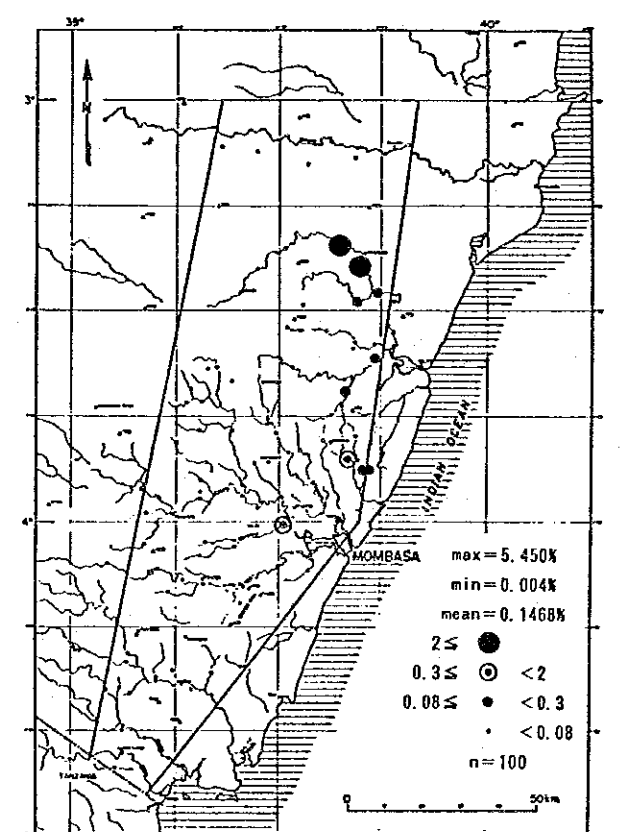
Cu



Fe



S



U



Figure

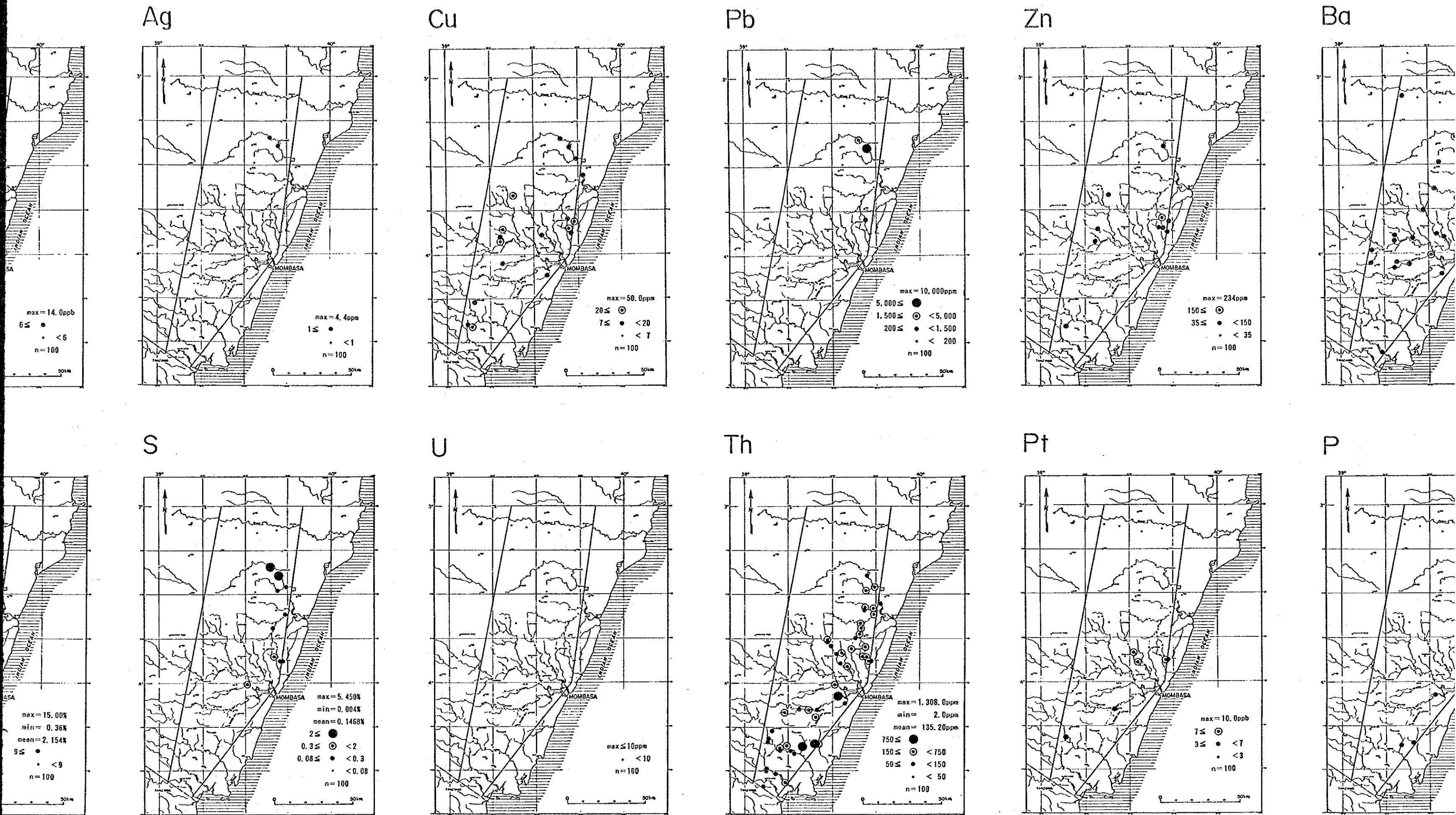
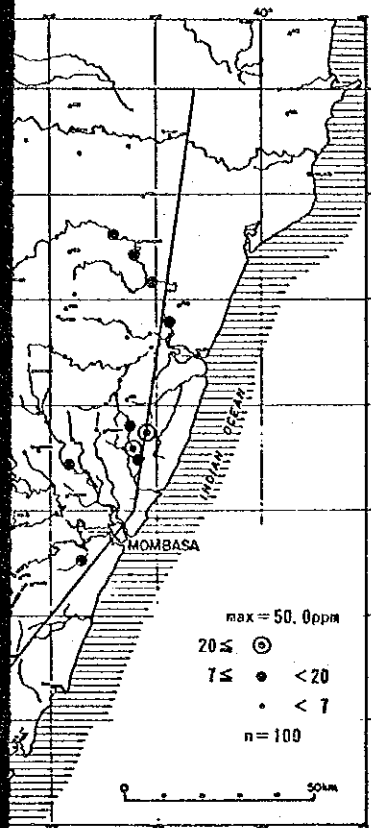
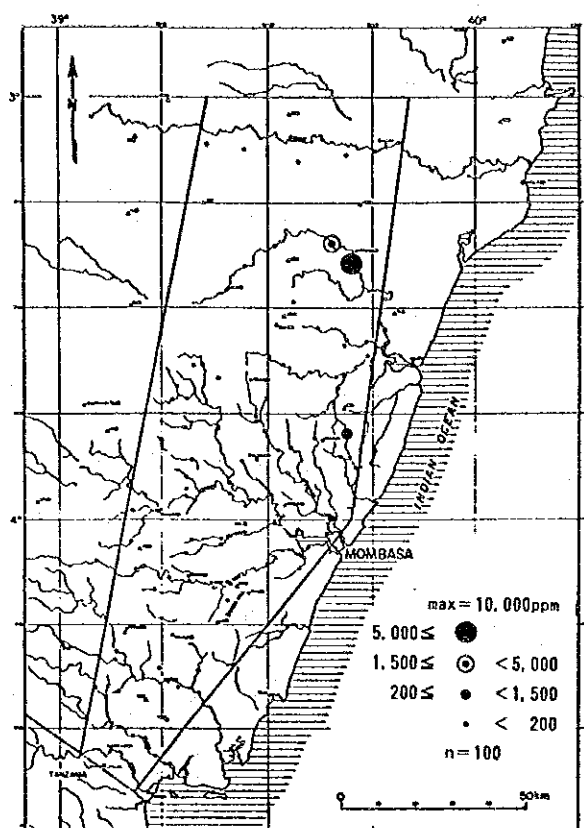


Figure GC-2 Distribution of 14 selected elements in pan-concentrated stream sediments from the Mombasa area

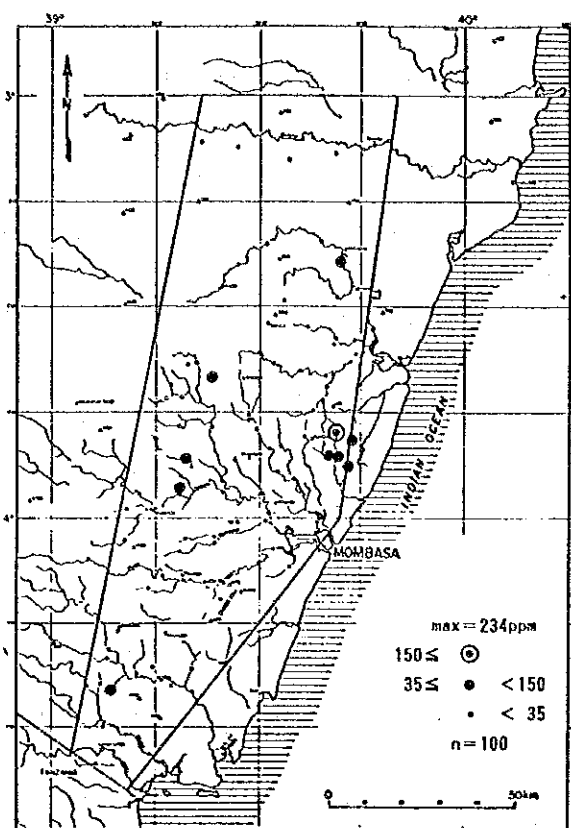
Pb



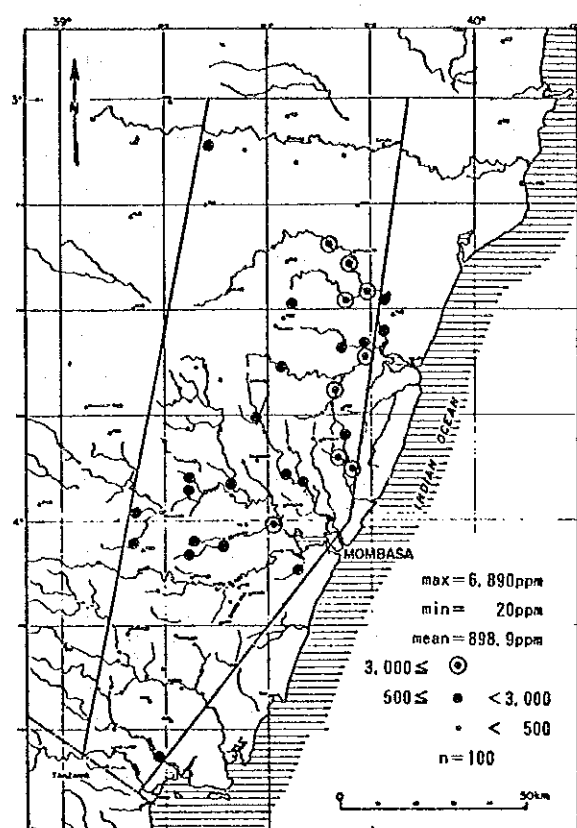
Zn



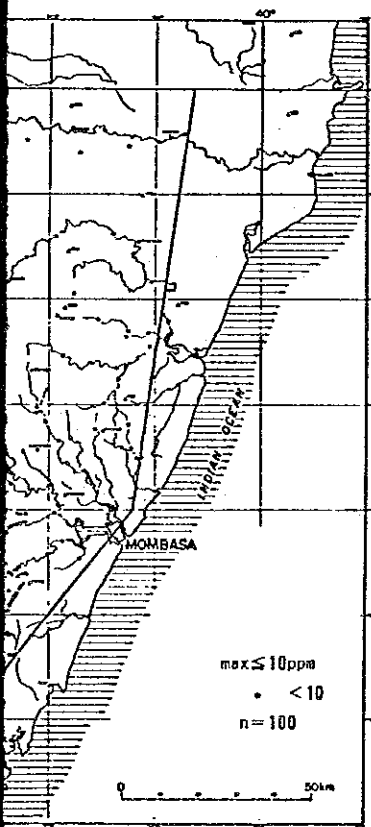
Ba



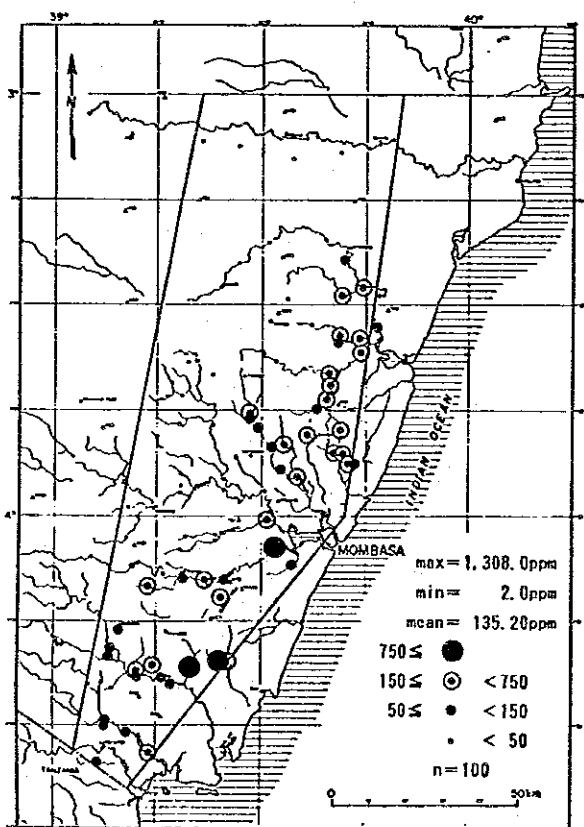
Mn



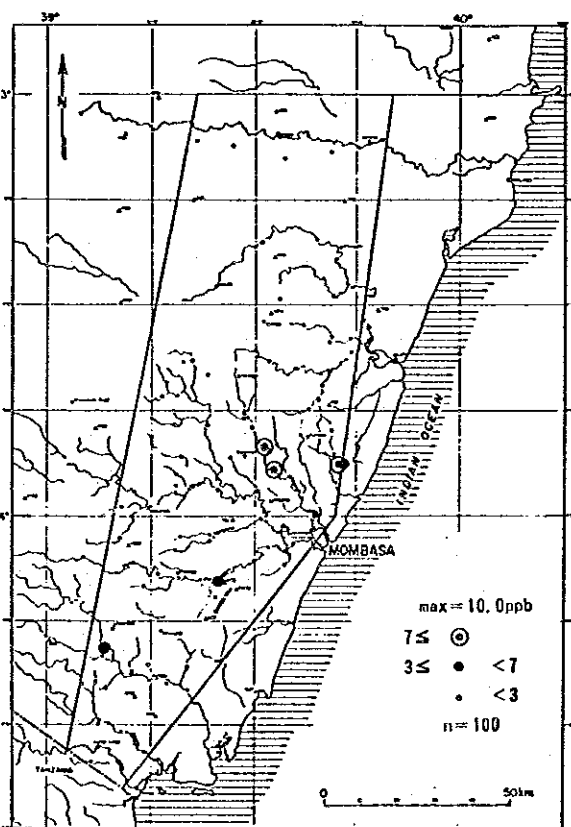
Th



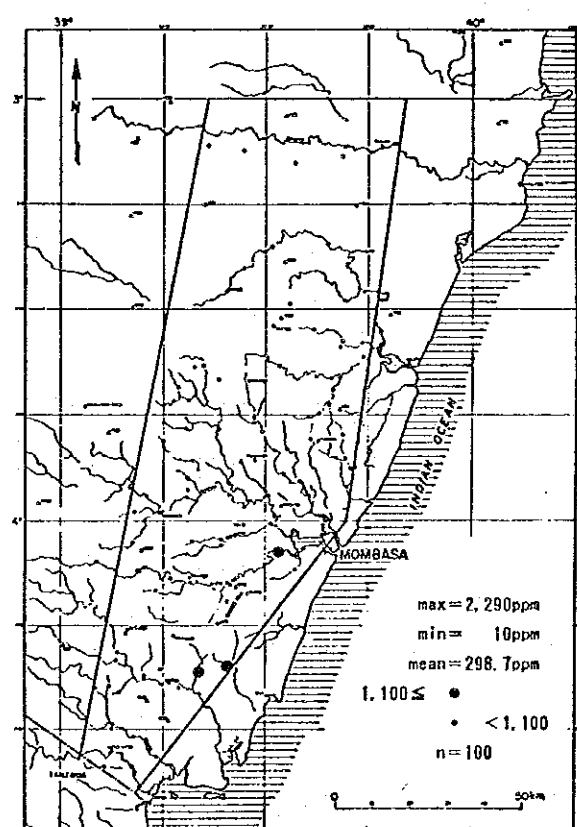
Pt



P



Hg



Distribution of 14 selected elements in pan-concentrated stream sediments from the Mombasa area

バックグラウンド母集団に分割した (Figure GC-1)。Th異常値は本地域内に広範な分布を示している (Figure GC-2)。

プラチナ： 試料中のPt含有量は、2.5 ~10ppb Ptで変動する。Pt母集団は、3及び7 ppb Ptで3母集団に分割される (Figure GC-1)。3 ppb Pt以下の母集団はバックグラウンド母集団とみられる。Pt異常値を示す試料は5か所にあり、本地域の南半部に分布している (Figure GC-2)。

燐： Th値の頻度分布は、バックグラウンド母集団の分割が困難な多峰型を示している (Figure GC-1)。P値が1,100ppmを越える試料は、本地域南部、Mrima Hillの北に位置している。

水銀： Hg値の大半 (約70%) は1 ppm Hg (検出限界) 以下である。第1異常、第2異常及びバックグラウンド母集団の分割のため、30及び6 ppm Hgのしきい値を選んだ。30ppm Hg以上の異常値を示す試料は本地域北部、Vitengeni 付近で採取されている。

(2) 土壌による地化学探査

土壌地化学探査は、モンバサ地域内の Mrima Hill-Jombo Hill, Kinangoni, Mkundi, Mkang'ombe及び Mangea-Kwa Daduの各地区で実施した (Figure GC-6)。

フィールド作業

土壌試料は、原則として、深さ約20cm、腐植層が発達しているところではその下部から採取した。試料採取間隔は、鉱物のサイズ及び強さに応じて、約50mから500mとした。

Mkundi地区ではグリッド・サンプリングを採用した。各地区の各地点から採取した試料は、天日乾燥し、次いで80meshで篩分した。約200gの試料を集めて分析用試料とし、分析所に送付した。

地化学分析

地化学分析は、Chemex Labs Ltd., Canadaで実施した。土壌試料は、次の9元素について分析された； Au, Ag, Cu, Pb, Mn, Fe, 及びS試料は、まず、Nitric-Aqua Regia Digestion 処理された。Au及びAgを除くCu, Pb, Zn, Ba, MnおよびFeはICP-AES(Inductively Coupled Plasma-Atomic Emission Spectrometry)； AuはFA-ICP-AFS (Fire Assay-ICP-Atomic Fluorescence Spectrometry)； 及びAgはAAS (Atomic Absorption Spectrometry) により、それぞれ測定された。また、SulfurはLeco Induction Furnace-IR Detector を使用して測定された。

結果及び検討

土壌試料の分析は次の9元素について、即ち、Au, Ag, Pb, Zn, Ba, Mn, Fe, 及びSについて行なった。以下に、各元素別の解析結果を要約する。分析結果を次の3グループに分けて統

計解析を行なった。即ち、鉱徴の型に従って、それぞれ、Mrima Hill-Jombo Hill 地区、Kinangoni, Mlangombe, 及び Mungea-Kwa Dadu地区、及び Mkundi 地区の3グループに分けた。各グループ別の頻度及び累積頻度分布を Figure GC-3, 6 及び10に、元素別分析値の分布を地区別に Figure GC-4, 5, 7, 8, 9, 及び11に示した。

(A) Mrima Hill-Jombo Hill 地区

金： Au分析値は2 ppm ~ 64ppmで変動し、ピークの多い型の頻度分布パターンを示している。従って、2つ以上の母集団からなっているものとみられる。この解析では、45, 13, 及び6 ppm の3つのしきい値を設定して、それぞれ、第1, 第2, 第3異常及びバックグラウンド母集団に区別した。Au異常値の分布を Figure GC-4及び5に示す。

銀： 試料の95%は0.2ppm Ag(検出限界)以下にある。この解析では、0.8 及び 0.2ppm Agの2つのしきい値を設定して異常母集団、異常の可能性のある母集団、及びバックグラウンド母集団に区別した。Ag異常値の分布は Figure GC-4及び5に示すとおりである。

銅： Cu分析値は1 ppm(検出限界)以下から169ppmまでの範囲で変動する。Ag分析値母集団は明らかに2つ異常の母集団からなっている。この解析では、70ppm Cu以上の母集団が異常とみている。70ppm Cu以上の異常は Jombo Hill のみにある (Figure GC-3)。

鉛： Pb分析値は2 ppm(検出限界)以下から626ppmまでの範囲で変動し、2つ以上の母集団はからなっている。この解析では、500 及び30ppm Pbの2つのしきい値を設定して、第1異常, 第2異常, 及びバックグラウンド母集団に、それぞれ区別した。異常値の分布は Figure GC-2及び3に示すとおりである。

亜鉛： Zn分析値は2 ppm(検出限界)以下から 1,955ppm までの範囲で変動する。Ba値の母集団は明らかに2つの母集団からなっている。この解析では、1600及び 400ppm Znの2つのしきい値を設定して、第1異常, 第2異常, 及びバックグラウンド母集団に、それぞれ区別した。異常値の分布は Figure GC-2及び3に示すとおりである。

バリウム： 試料の15%以上が10,000ppm(分析の上方限界)を越えている。この解析では、1,100ppm Ba 以上の値を異常とした。これら異常値の分布は、Figure GC-2 及び3に示すとおりである。

マンガン： 試料の40%以上が10,000ppm(分析の上方限界)を越えている。この解析では、2,400ppm Mn 以上の値を異常とした。これら異常値の分布は、Figure GC-2 及び3に示すとおりである。

鉄： 試料の50%以上が15% (分析の上方限界)を越えている。この解析では、6% Fe 以上の値を異常とした。これら異常値の分布は、Figure GC-2 及び3に示すとおりである。

硫黄： 試料中のS含有量は 0.005~1.890 %間で変動する。このS値からなる母集団は、明瞭に3つの母集団からなっている。この解析では、0.5 及び0.02% Sの2つのしきい値を設定して、第1異常, 第2異常, 及びバックグラウンド母集団に、それぞれ区別した。S異常値の分布は Figure GC-2及び3に示すとおりである。

(B) Kinangoni, Mkang'ombe 及び Mangea-Kwa Dadu 地区

金： 試料の30%近くが1 ppb(検出限界)以下の値を示した。Au値の頻度分布から、100, 20及び4 ppb をしきい値として選んだ。この解析は、Au値 20ppb以上は明らかに異常とみなし、4~20ppb Auは異常の可能性のあるものとした。120 試料のうち、2 試料が顕著な高い値、30 ppb 及び407ppbを示した。この2 試料は Kinangoni及び Mkang'ombe で、それぞれ採取された。

銀： 試料の80%以上が0.2ppm(検出限界)以下の値を示した。Ag値0.6ppm以上を異常とみなし、0.2~0.6ppm Ag は異常の可能性のあるものとした。検出限界以上の値を示す試料は Kinangoni にのみ在る。

銅： 試料中の Cu 値は0.1ppm(検出限界)から81ppm 間で変動し、2つ以上の母集団からなっている。この解析では、Cu値 60ppm以上を異常とみなした。異常を示した試料は1つだけで、その試料は Mkang'ombe で採取された。

鉛： 試料中のPb値は2 ppm(検出限界)から5,220ppm間で変動し、2つ以上の母集団からなっている。この解析では、100 及び 300ppm Pbの2つのしきい値を設定して、第1異常、第2異常、及びバックグラウンド母集団に、それぞれ区別した。異常は、Kinangoni で採取した試料にのみ在る。

亜鉛： 試料中のZn値は2 ppm(検出限界)以下から1,410ppm間で変動する。この解析では、Zn値400ppm以上を異常とみなした。異常は、Mkang'ombeで採取した試料にのみ在る。

バリウム： 試料中の Ba 値は 55ppm~6,570ppm間で変動する。Ba値の母集団は2つ以上の母集団からなっている。この解析では、1,500 及び 600ppm Baの2つのしきい値を設定して、第1異常、第2異常、及びバックグラウンド母集団に、それぞれ区別した。Ba異常値の分布は、Figure GC-7, 8及び9に示すとおりである。

マンガン： 試料中の Mn 値は5 ppm(検出限界)から2,310ppm間で変動する。この解析では、累積頻度分布線の微小な変化から1,100ppm Mn をしきい値に選んだ。Mn異常値は Mangea-Kwa Daduから採取した試料にのみにみられる。

鉄： 試料中のFe含有量は0.62から 11.15%間で変動する。Fe値の頻度分布は正の歪度をもつ対数正規パターンを呈する。この解析では、しきい値を5%Feに設定した。Fe異常は、Mkang'ombeを除き、Kinangoni 及び Mangea-Kwa Daduで採取した試料中にある。

硫黄： 試料中のS含有量は0.009~2.470%間で変動する。S値の頻度分布は正の歪度をもつ対数正規パターンを呈する。この解析では、0.5 及び 0.1%Sの2つのしきい値を設定して、第1異常、第2異常、及びバックグラウンド母集団に、それぞれ区別した。S異常は、Mangea-Kwa Dadu を除き、Kinangoni 及び Mkang'ombe で採取した試料中にある。

(C) Mkundi 地区

金： 試料の大半(約90%)は、1 ppb Au(検出限界)以下を示した。累積頻度分布図から7 ppb をしきい値に選んだが、異常試料はわずかに1個であった(Figure GC-11)。

銀： 試料の95%近くが、0.2ppm Ag(検出限界)以下を示した。この解析では、1.2ppm Ag

を異常とみなした。異常試料はわずかに1個であった。(Figure GC-11)。

銅： 全試料が15ppm Cuであった。

鉛： 試料の99%以上が60ppm Pb以下であった。

亜鉛： 試料の99%以上が50ppm Pb以下であった。

バリウム： 試料中の Ba 値は10ppm(検出限界)以下から1,540ppm間で変動する。この解析では、1,000 及び300ppm Ba の2つのしきい値を設定して、第1異常、第2異常、及びバックグラウンド母集団に、それぞれ区別した。Ba異常値の分布は、Figure GC-11に示すとおりである。

マンガン： 試料中のMn値は5 ppm(検出限界)以下から1,525ppm間で変動する。この解析では、累積頻度分布線の微小な変化から1,100ppm Mn をしきい値に選んだ。異常値試料はわずかに2個であった(Figure GC-11)。

鉄： 全試料2.81% Fe 以下を示した。この Fe 値の母集団は、累積頻度分布線がほぼ直線に近く、単一母集団からなっているものとみられる。

硫黄： ほぼ全量が0.07%以下を示した。わずかに1試料が0.07%を越えた。

2-5 室内試験及びその結果

顕微鏡観察-岩石薄片-

Appendix II

顕微鏡観察-研磨片-

Appendix III

EPMA

Appendix IV

X線回折分析

Appendix V

Pb-Pb アイソトープ年代決定

Appendix VI

全岩分析

Appendix VII

A FMダイアグラム・FeO/MgO-SiO₂関係図・Feo-Feo/MgO 関係図

Appendix VIII

化学分析-鉍化岩-

Appendix IX

河床堆積物パンニング試料鉍物同定

Appendix X

地化学分析-河床堆積物パンニング試料-

Appendix XI

地化学分析-土壌-

Appendix XII

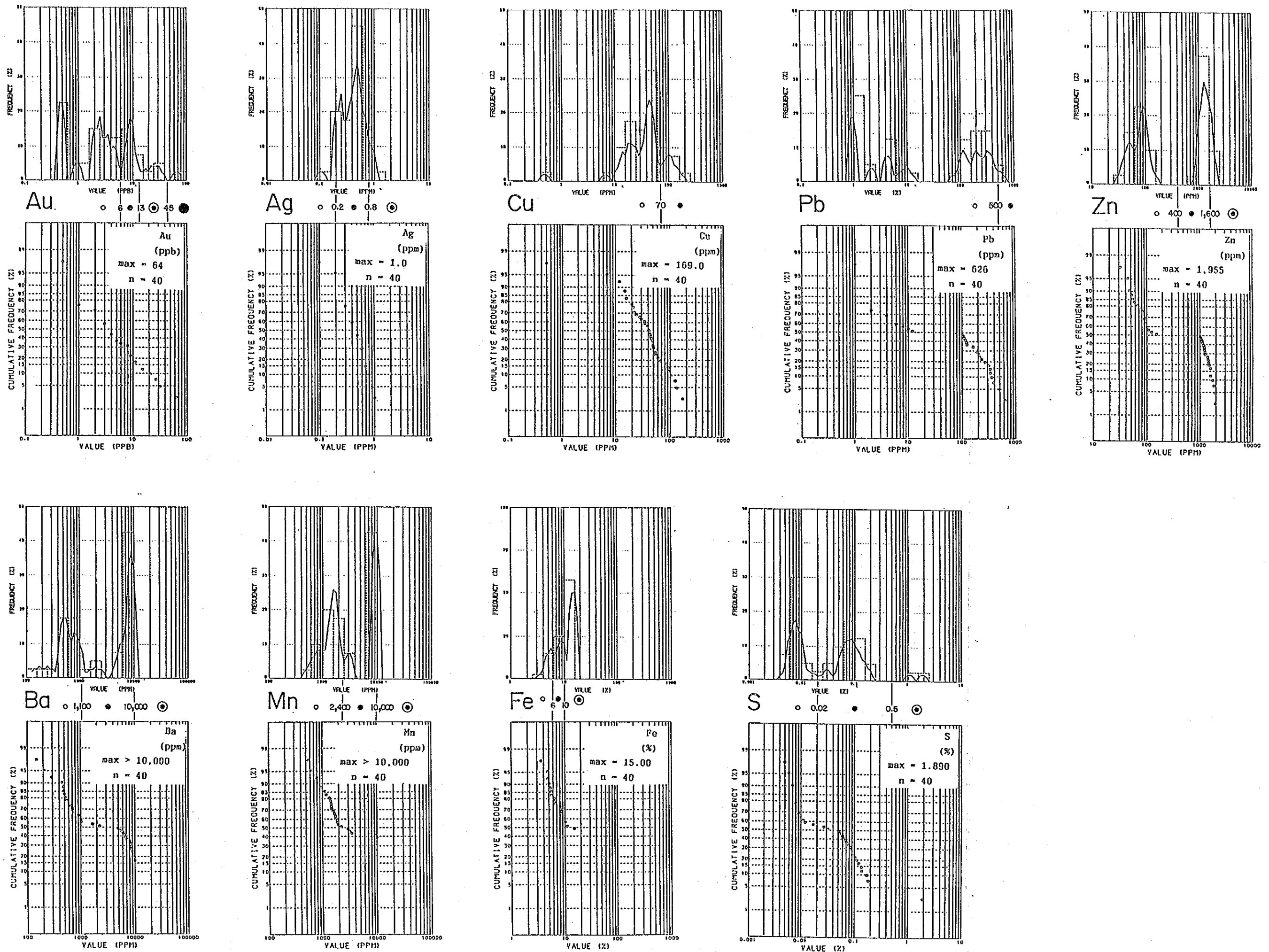
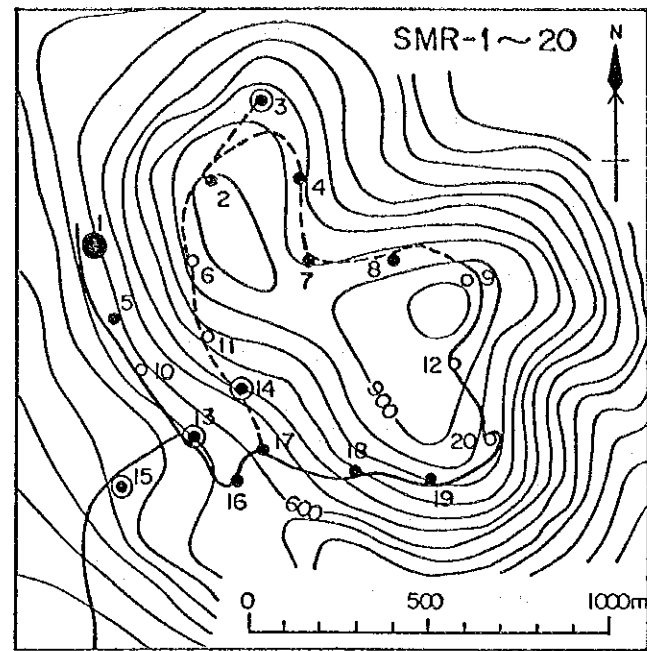


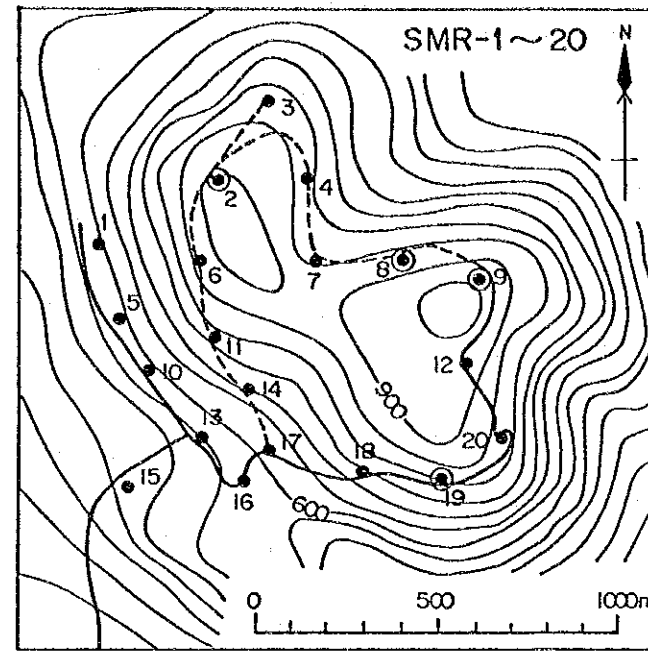
Figure GC-3 Frequency distribution and cumulative frequency distribution of 9 selected elements in soil from the Mrima Hill-Jombo Hill area

Au



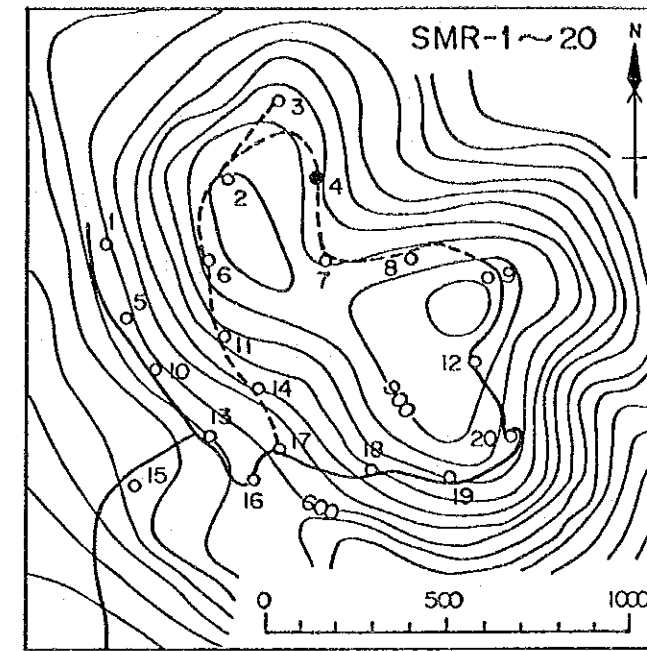
max = 64.0ppb
 45 ≤ ●
 13 ≤ ⊙ < 45
 6 ≤ • < 13
 ○ < 6
 n = 20

Ag



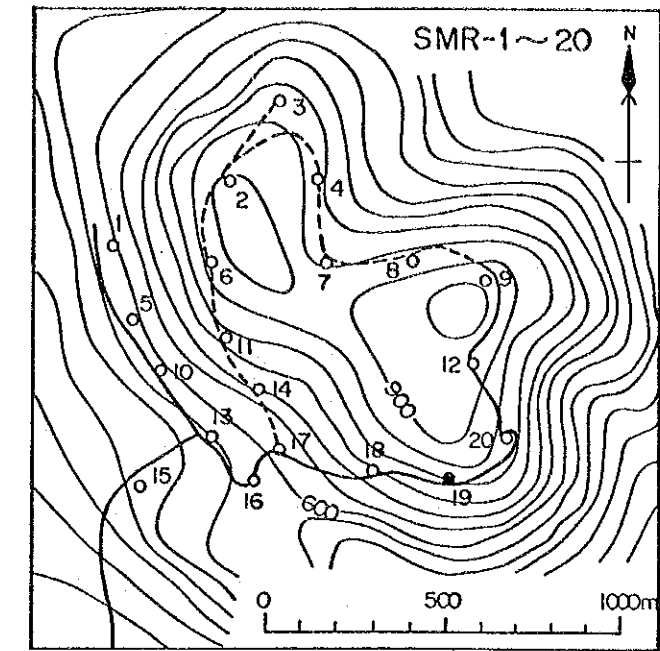
max = 1.0ppm
 min = 0.3ppm
 0.8 ≤ ⊙
 0.3 ≤ • < 0.8
 n = 20

Cu



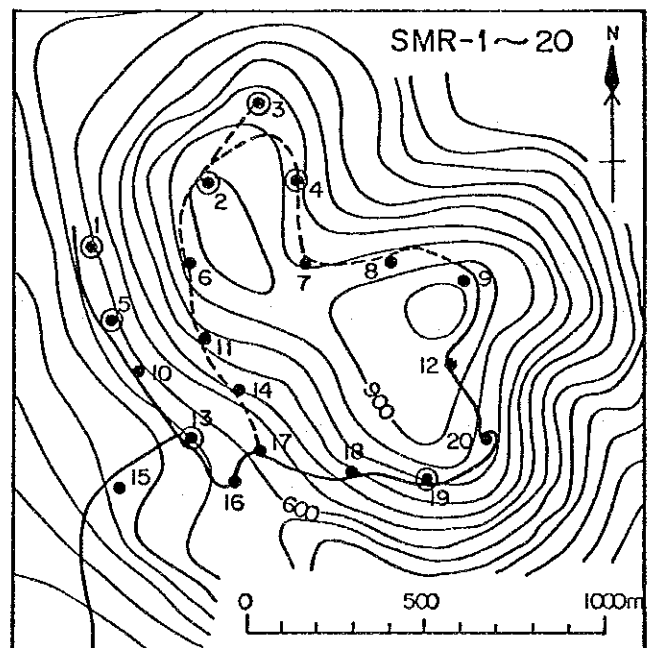
max = 55ppm
 55 ≤ ●
 ○ < 55
 n = 20

Pb



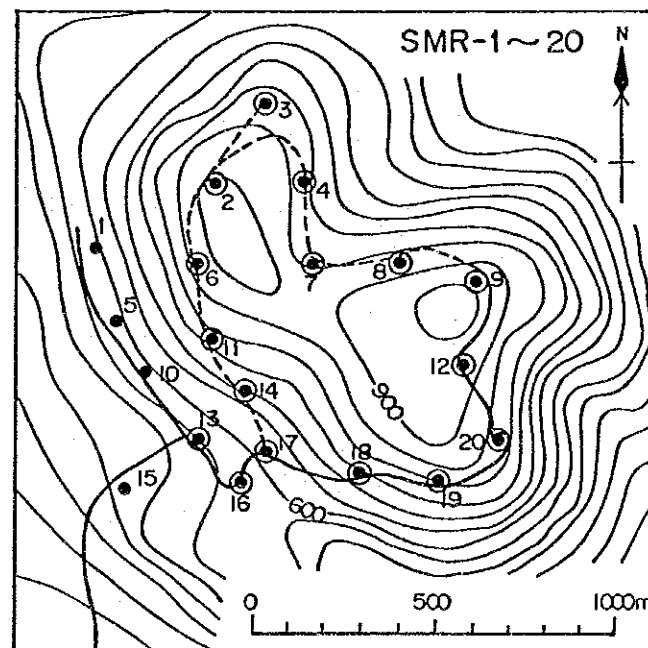
max = 626ppm
 min = 78ppm
 500 ≤ ●
 ○ < 500
 n = 20

Ba



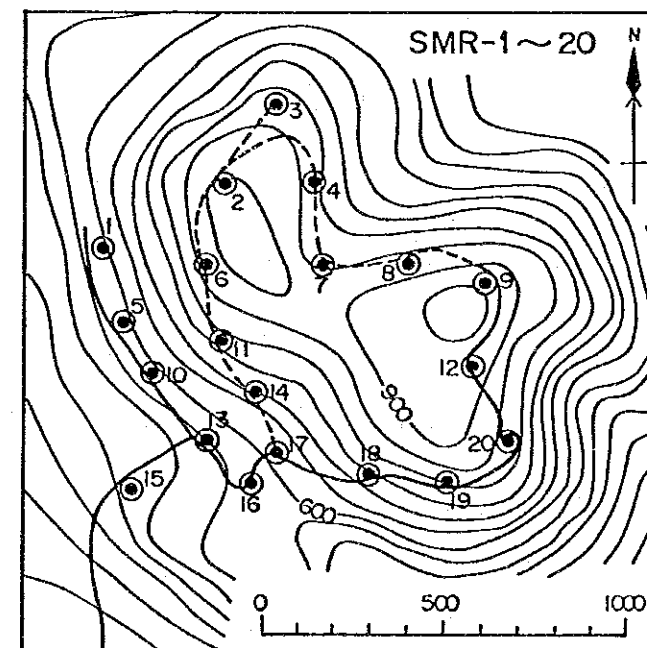
max > 10,000ppm
 min = 4,940ppm
 10,000 ≤ ⊙
 4,940 ≤ • < 10,000
 n = 20

Mn



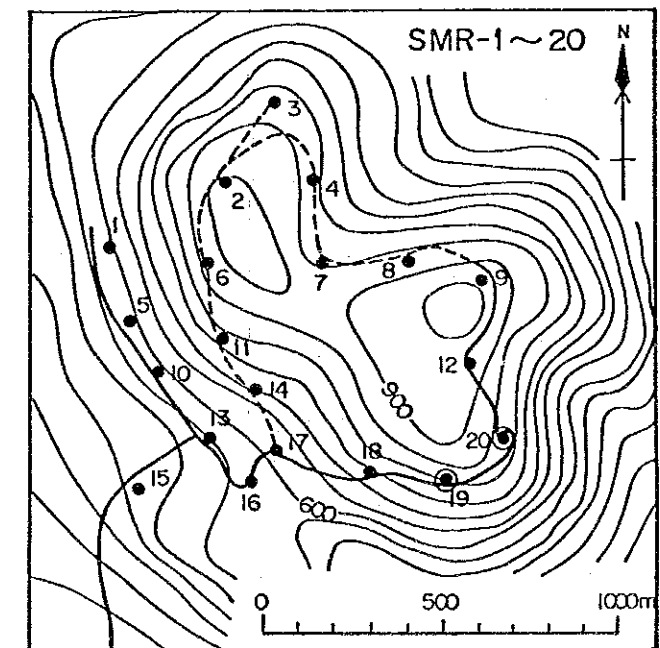
max > 10,000ppm
 min = 2,960ppm
 10,000 ≤ ⊙
 2,960 ≤ • < 10,000
 n = 20

Fe



max > 15.00%
 15.00 ≤ ⊙
 n = 20

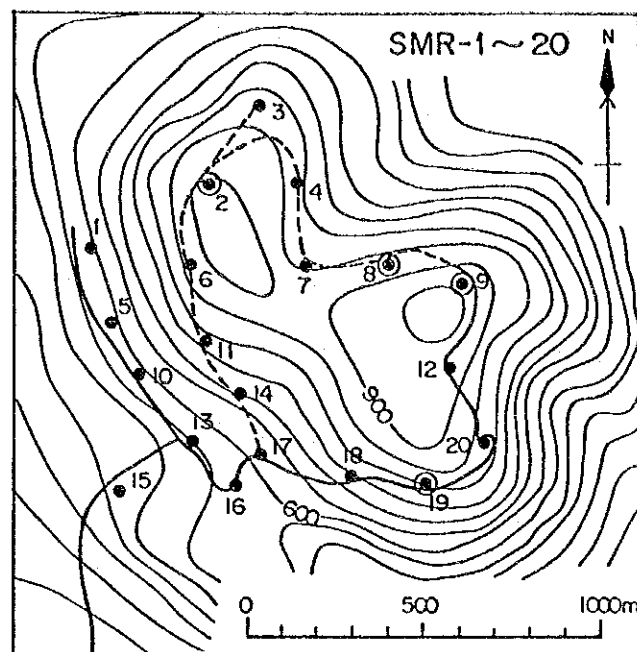
S



max = 1.890%
 min = 0.051%
 0.5 ≤ ⊙
 0.051 ≤ • < 0.5
 n = 20

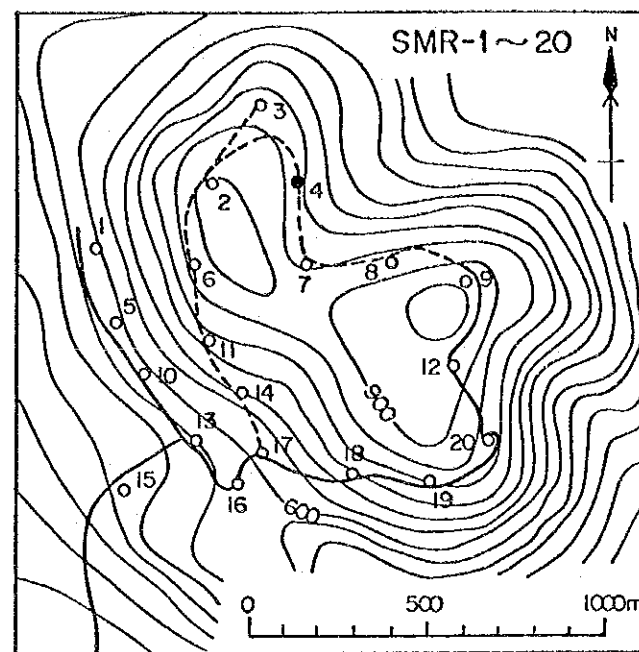
Figure GC-4 Distribution of 9 selected elements in soil from the Mrima Hill area

Ag



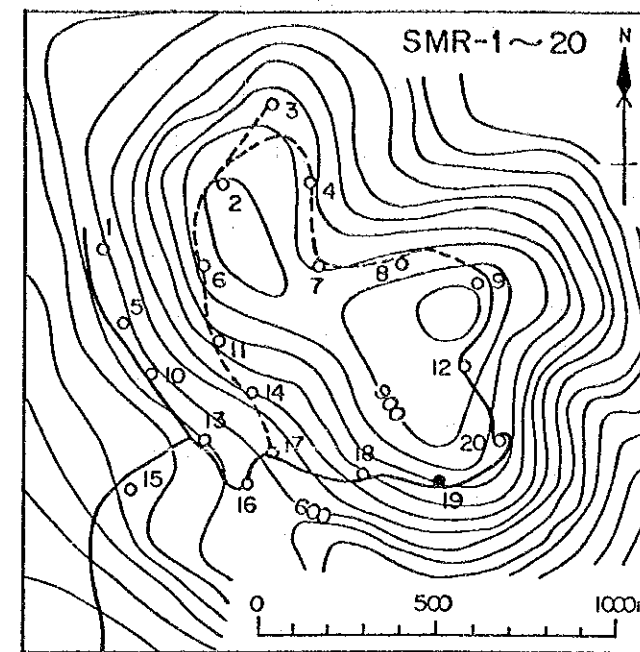
max=1.0ppm
 min=0.3ppm
 0.8 ≤ ●
 0.3 ≤ ● < 0.8
 n=20

Cu



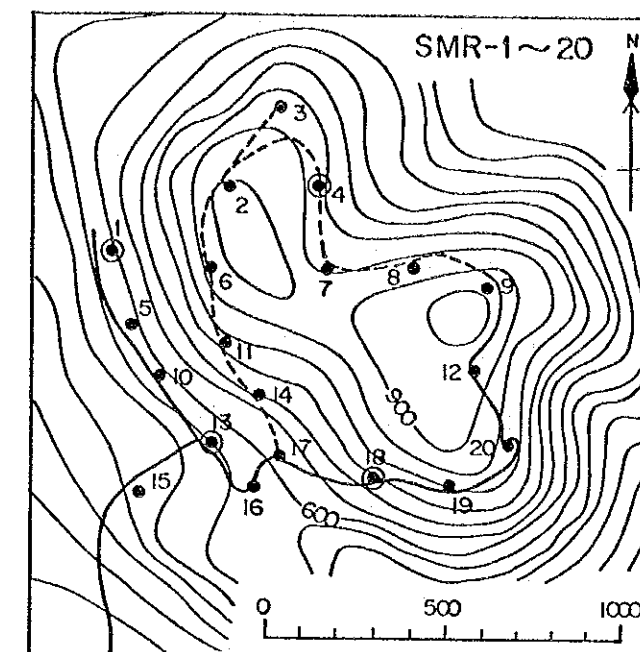
max=55ppm
 55 ≤ ●
 < 55 ○
 n=20

Pb



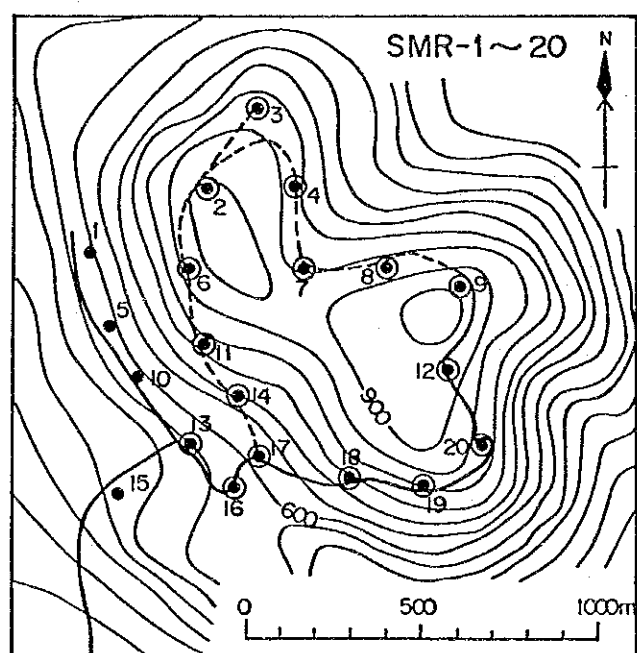
max=626ppm
 min=78ppm
 500 ≤ ●
 < 500 ○
 n=20

Zn



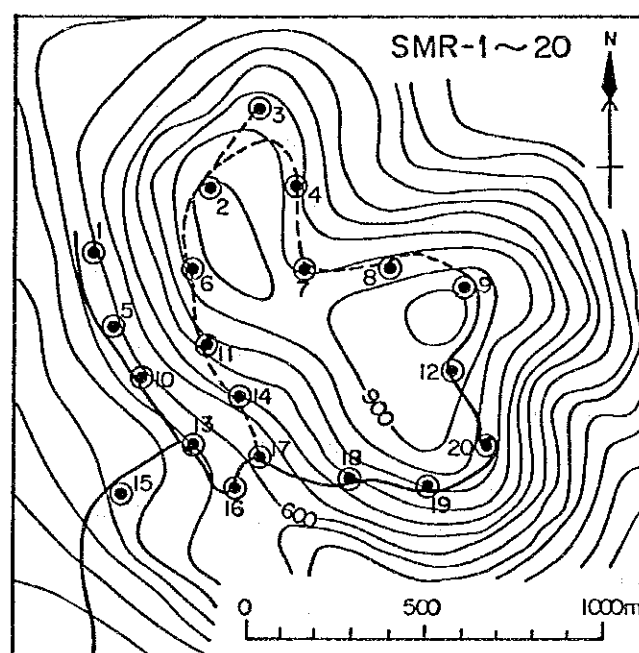
max=1,955ppm
 min=1,000ppm
 1,600 ≤ ●
 1,000 ≤ ● < 1,600
 n=20

Mn



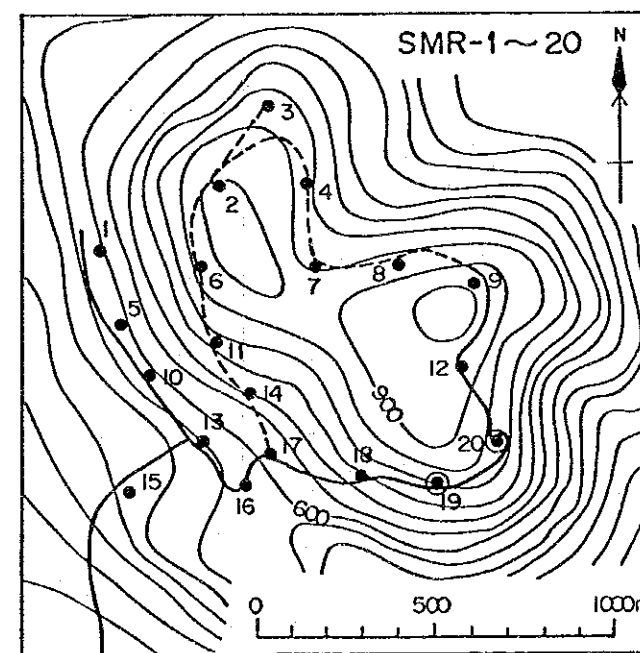
max>10,000ppm
 min=2,960ppm
 10,000 ≤ ●
 2,960 ≤ ● < 10,000
 n=20

Fe



max>15.00%
 15.00 ≤ ●
 n=20

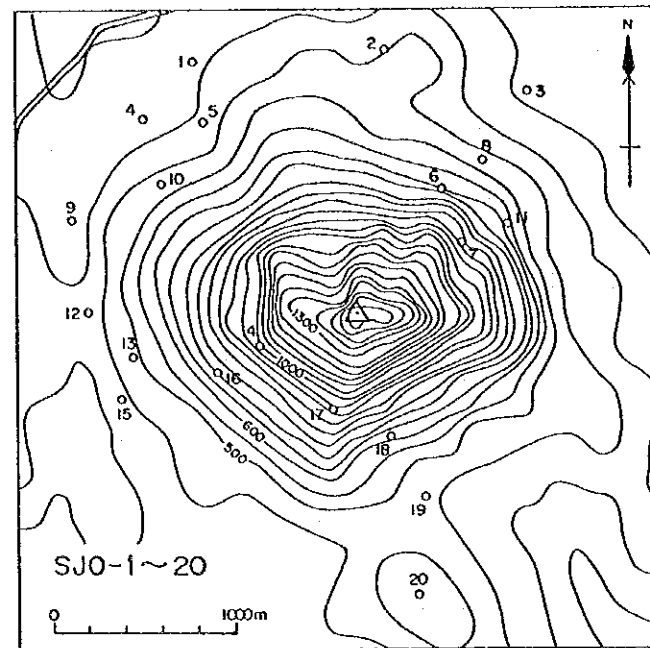
S



max=1.890%
 min=0.051%
 0.5 ≤ ●
 0.051 ≤ ● < 0.5
 n=20

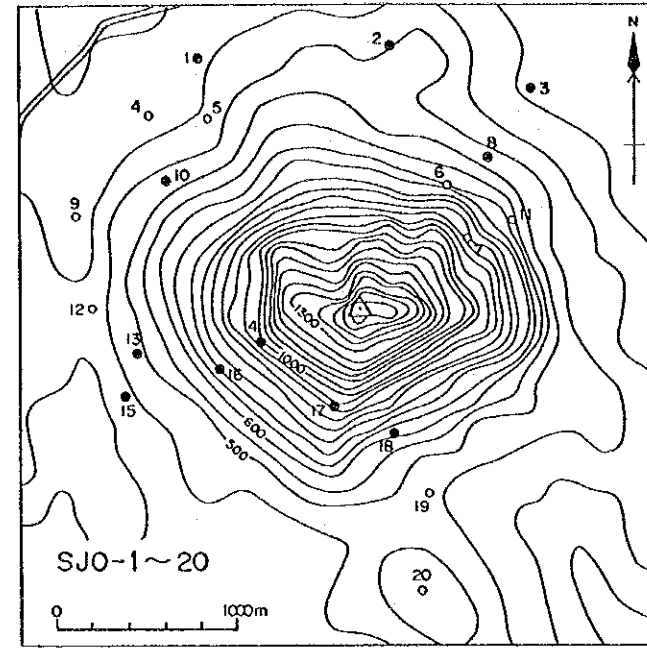
Figure GC-4 Distribution of 9 selected elements in soil from the Mrima Hill area

Au



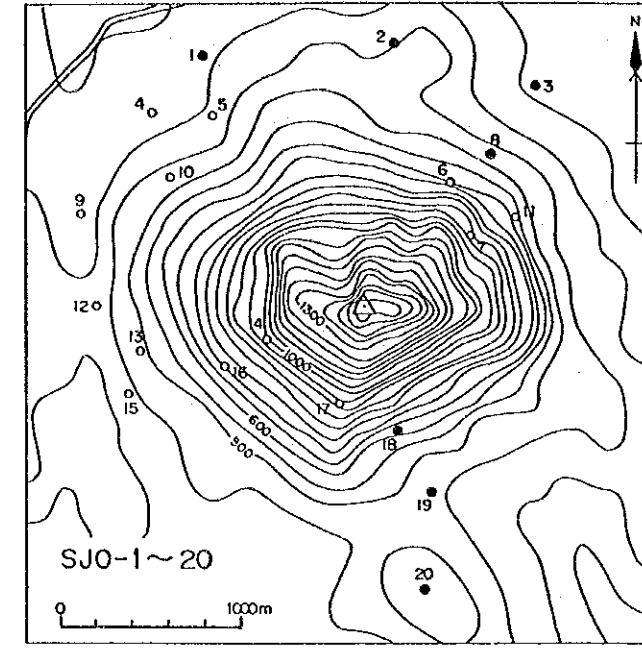
max = 5.0ppb
 ○ ≤ 5.0
 n = 20

Ag



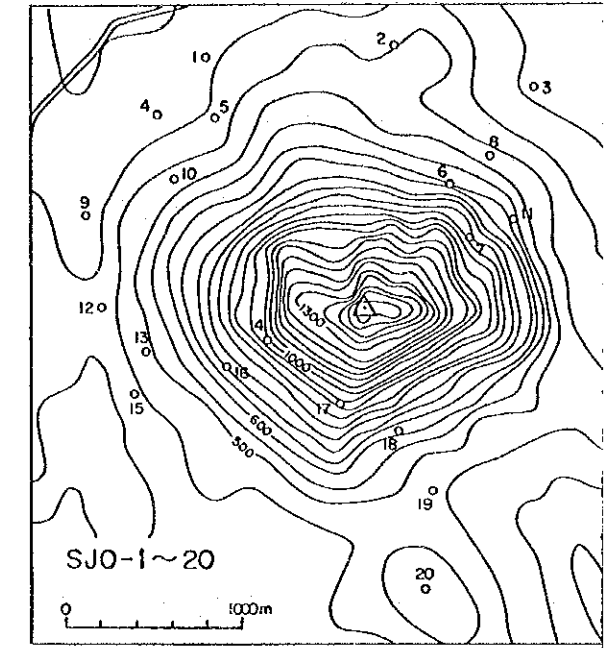
max = 0.6 ppm
 0.2 ≤ ●
 ○ < 0.2
 n = 20

Cu



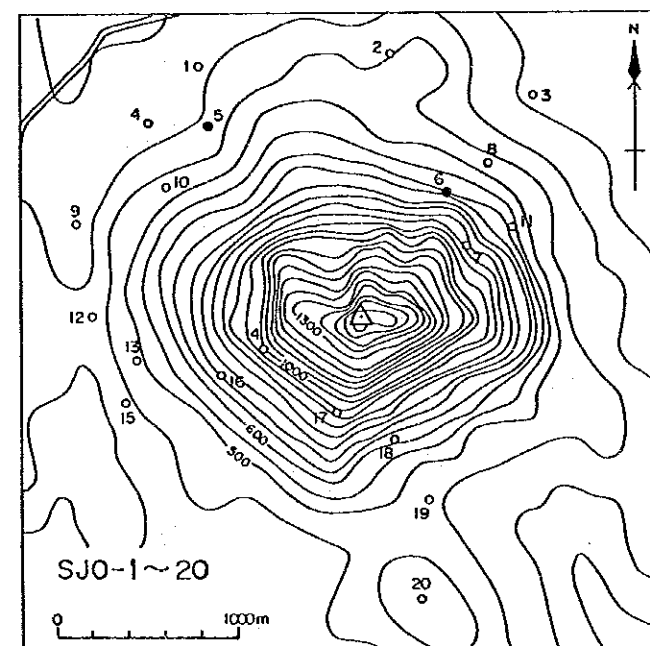
max = 169ppm
 min = 12ppm
 70 ≤ ●
 ○ < 70
 n = 20

Pb



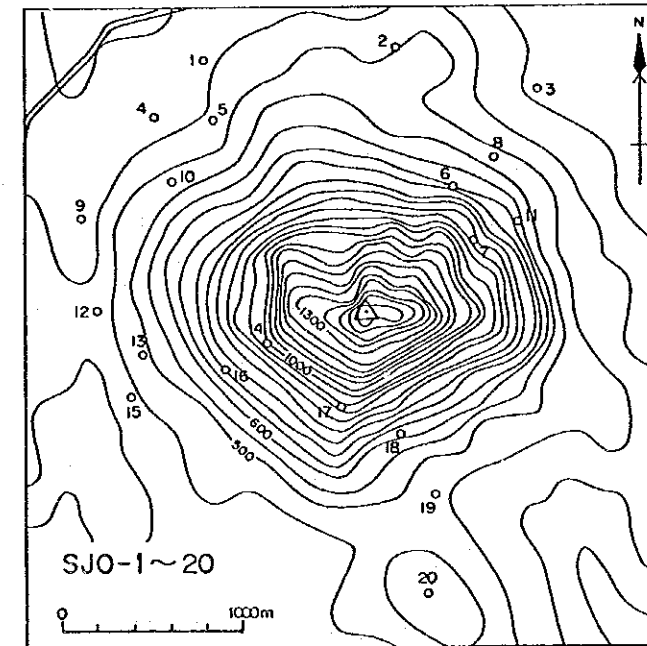
max = 12ppm
 ○ ≤ 12
 n = 20

Ba



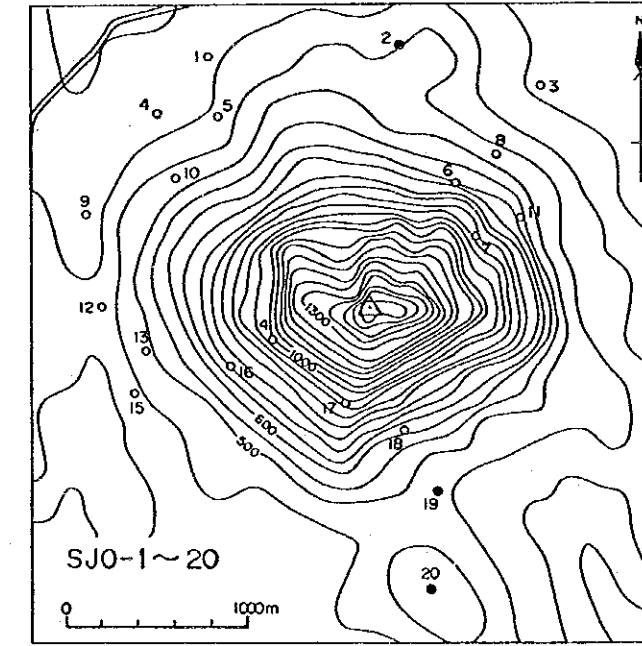
max = 2,250ppm
 min = 150ppm
 1,100 ≤ ●
 ○ < 1,100
 n = 20

Mn



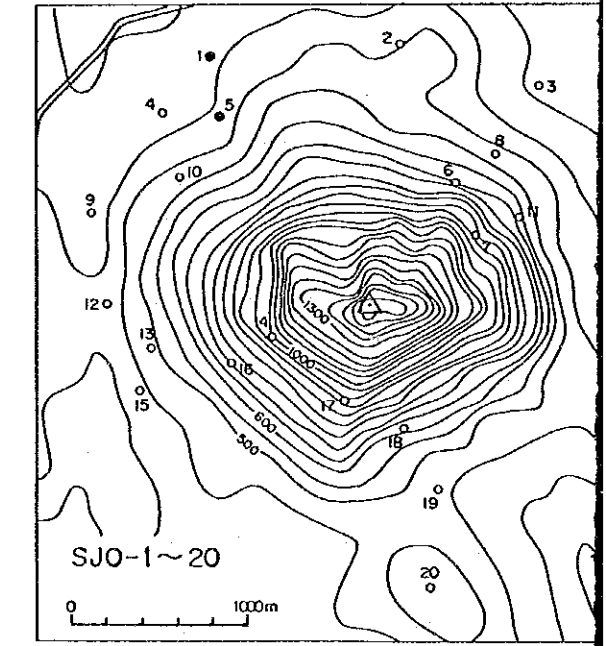
max = 2,220ppm
 min = 555ppm
 ○ ≤ 2,220
 n = 20

Fe



max = 10.95%
 min = 3.57%
 10 ≤ ●
 ○ < 10
 n = 20

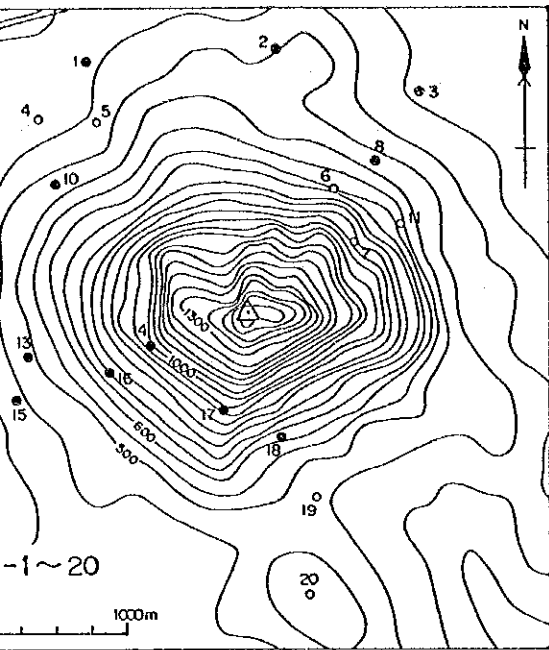
S



max = 0.032%
 min = 0.005%
 0.02 ≤ ●
 ○ < 0.02
 n = 20

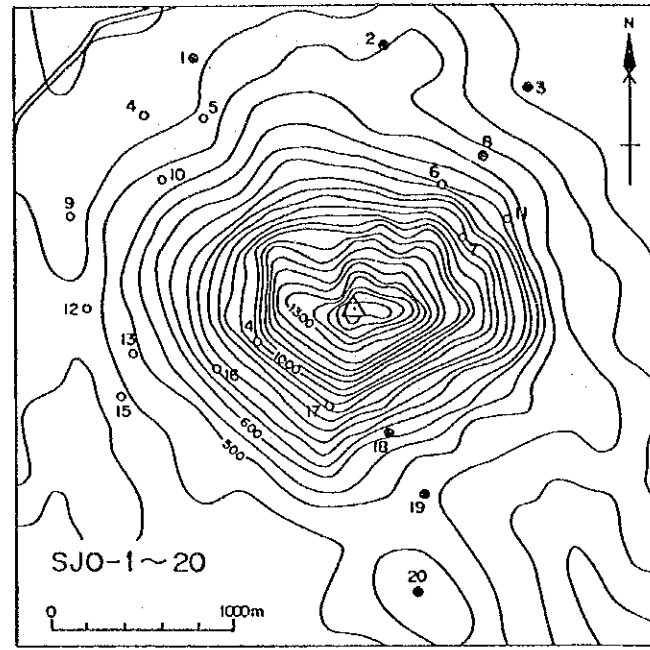
Figure GC-5 Distribution of 9 selected elements in soil from the Jombo Hill area

Cu



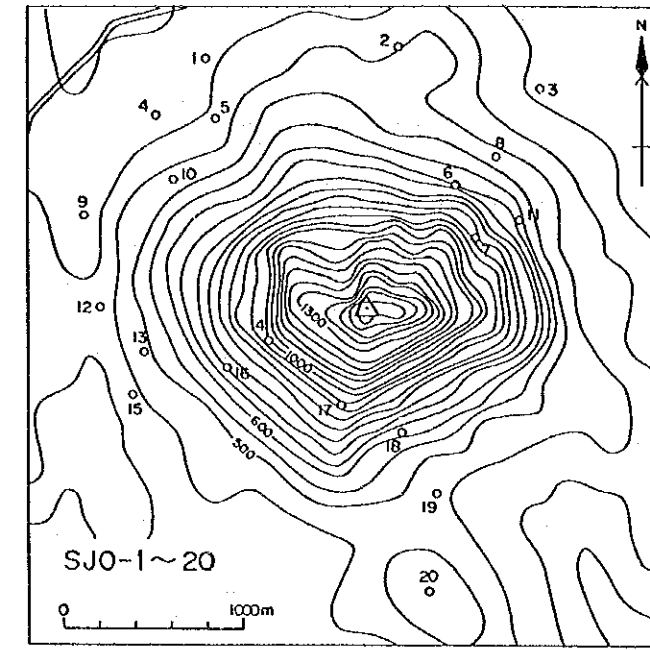
max = 0.6 ppm
 0.2 ≤ ●
 ○ < 0.2
 n = 20

Pb



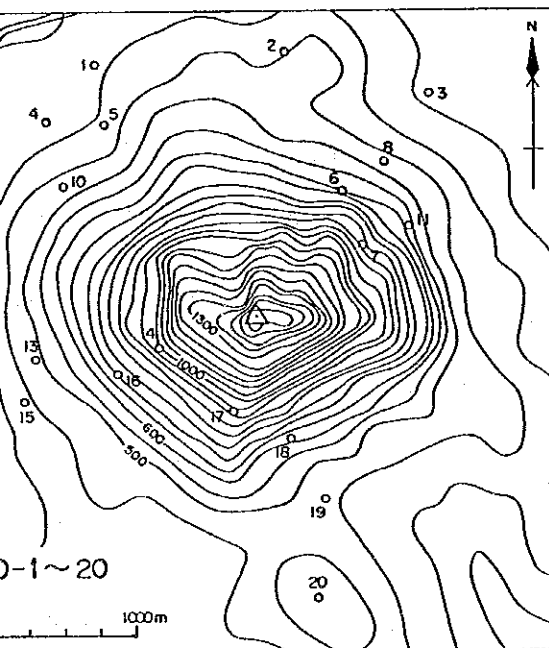
max = 169 ppm
 min = 12 ppm
 70 ≤ ●
 ○ < 70
 n = 20

Zn



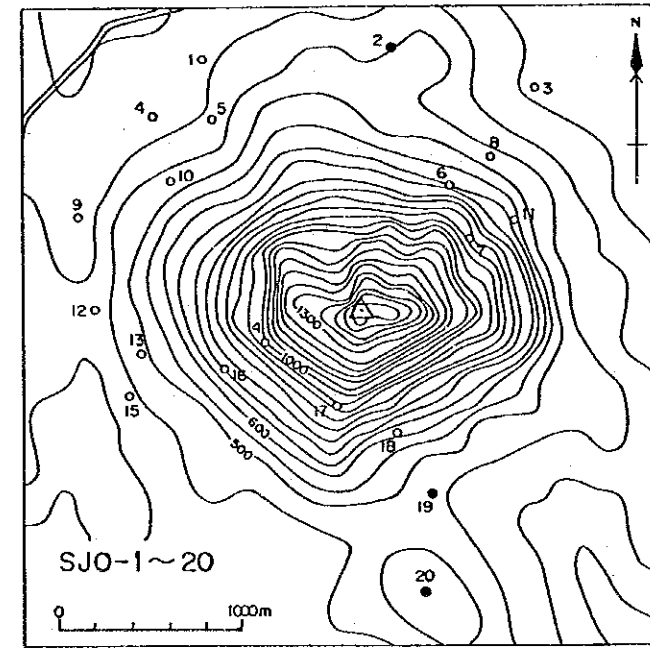
max = 154 ppm
 min = 32 ppm
 ○ ≤ 154
 n = 20

Fe

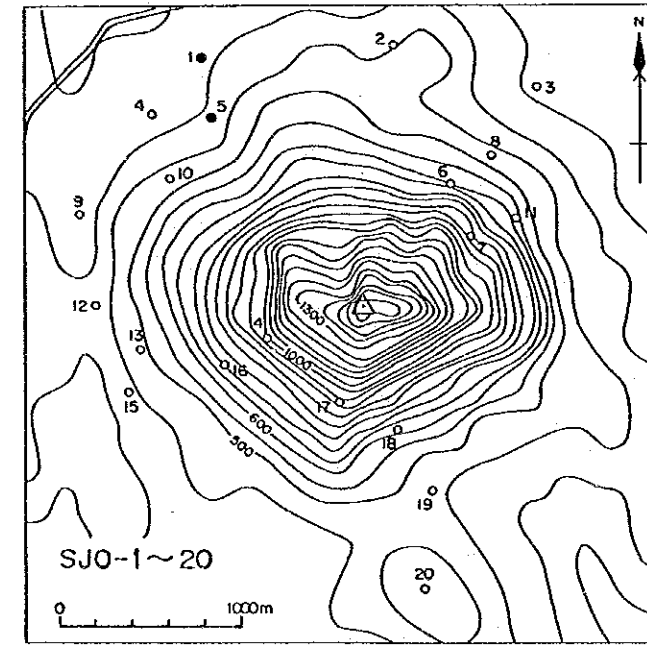


max = 2,220 ppm
 min = 555 ppm
 ○ ≤ 2,220
 n = 20

S



max = 10.95%
 min = 3.57%
 10 ≤ ●
 ○ < 10
 n = 20



max = 0.032%
 min = 0.005%
 0.02 ≤ ●
 ○ < 0.02
 n = 20

Figure GC-5 Distribution of 9 selected elements in soil from the Jombo Hill area

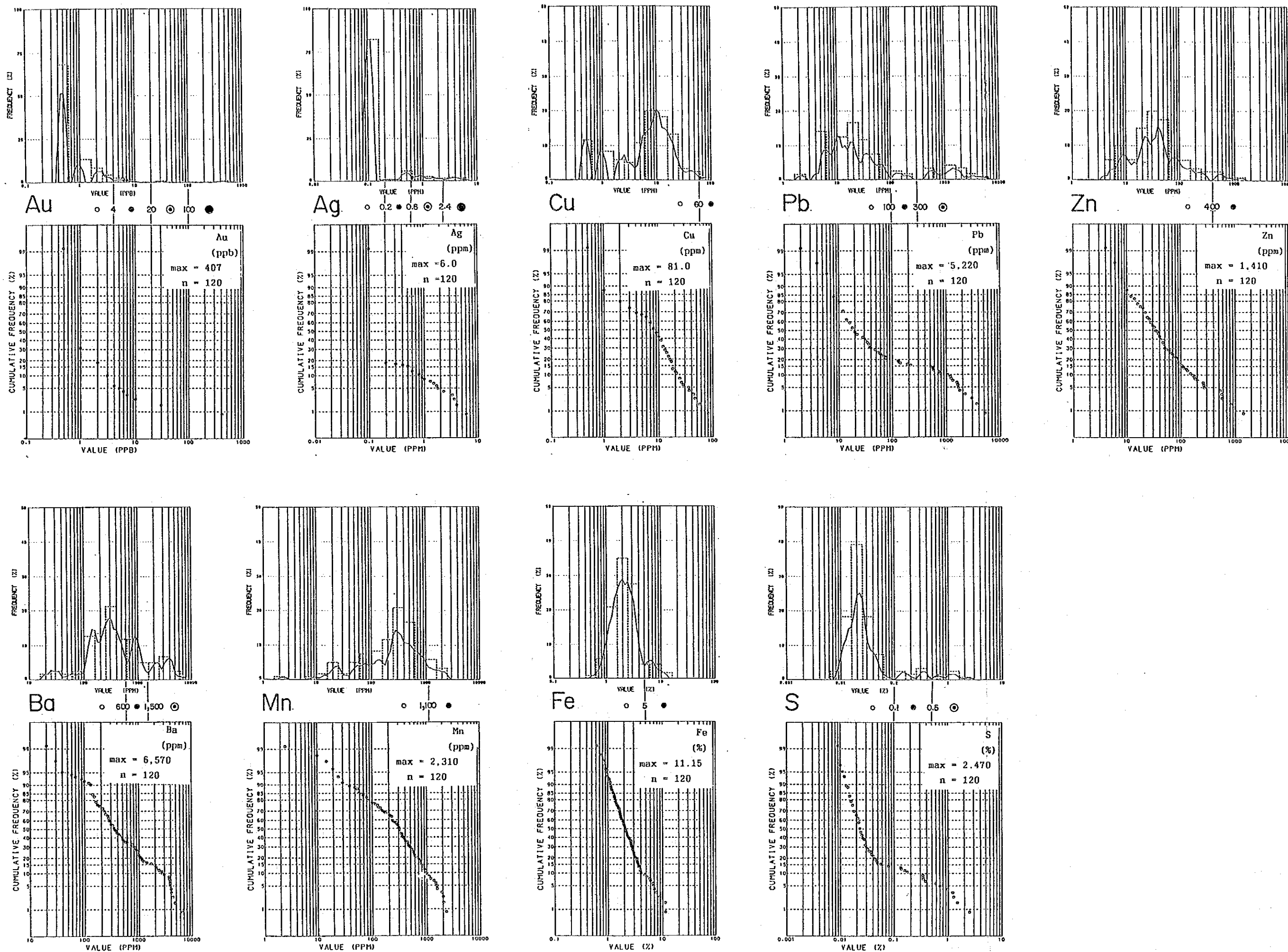
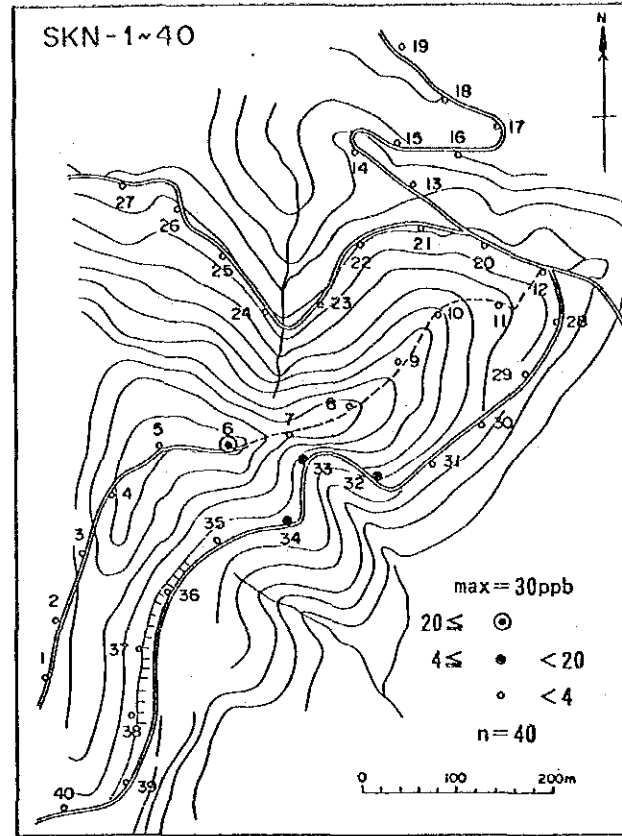
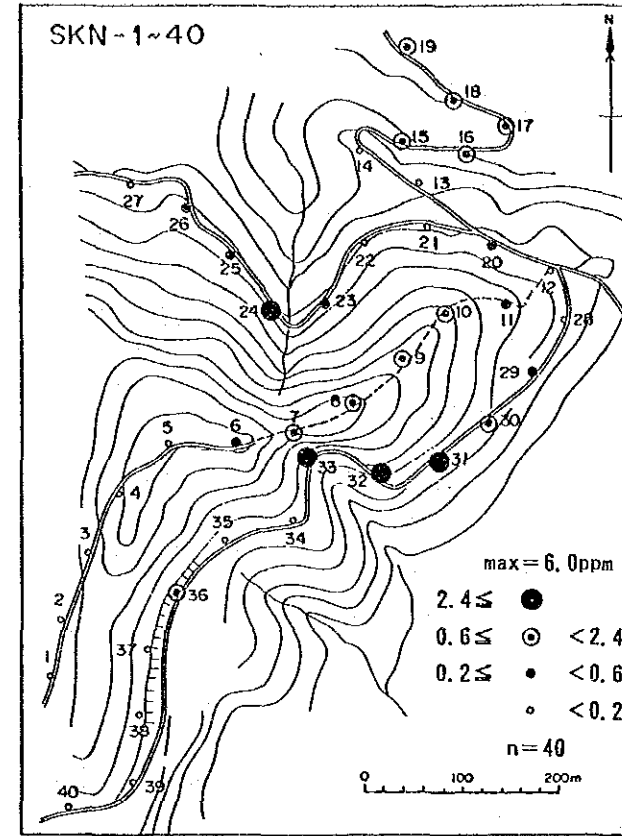


Figure GC-6 Frequency distribution and cumulative frequency distribution of 9 selected elements in soil from the Kinangoni, Mwang'ombe and Mungea-Kwa Dadu areas

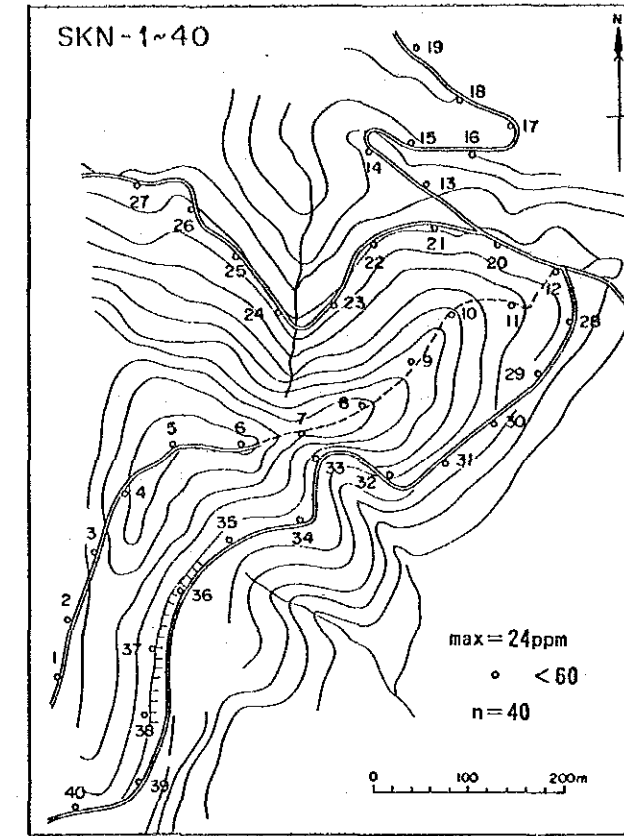
Au



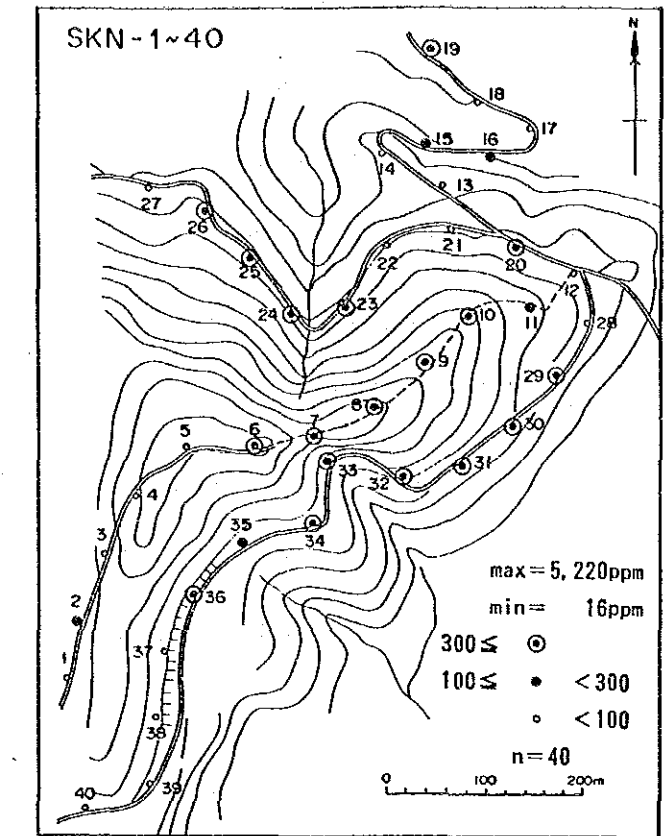
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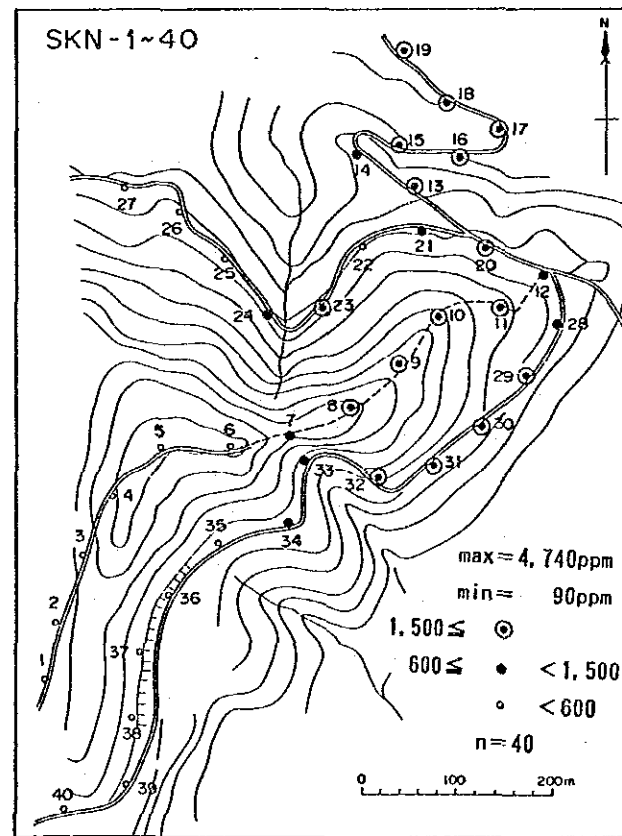
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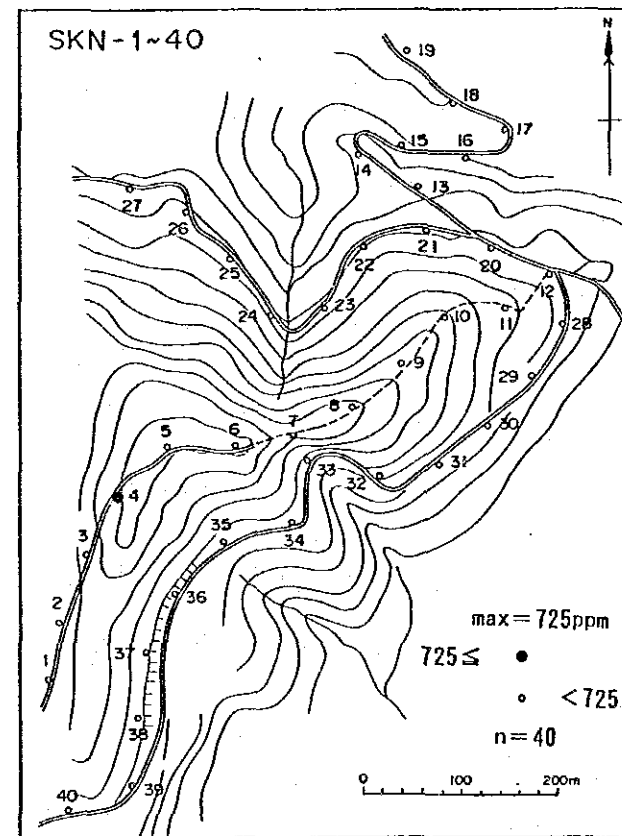
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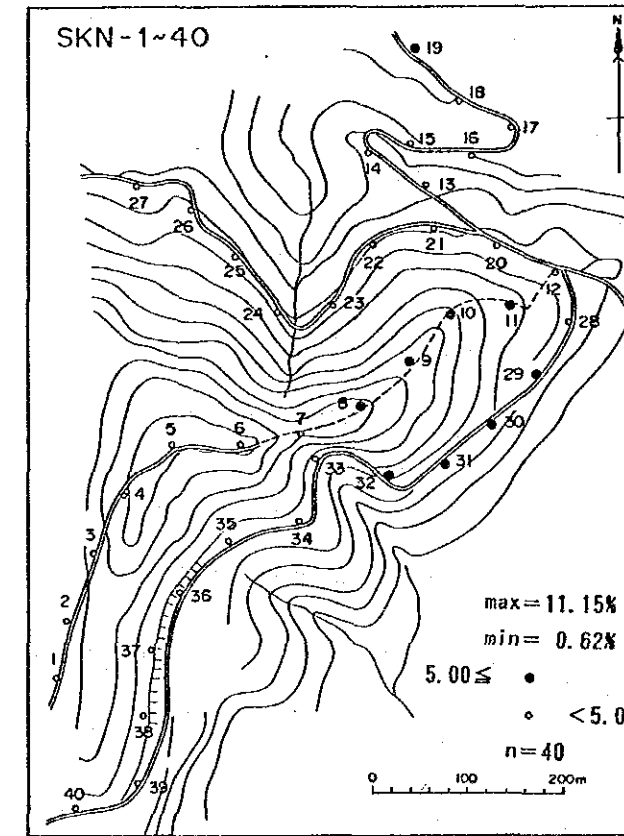
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Mn



Fe



S

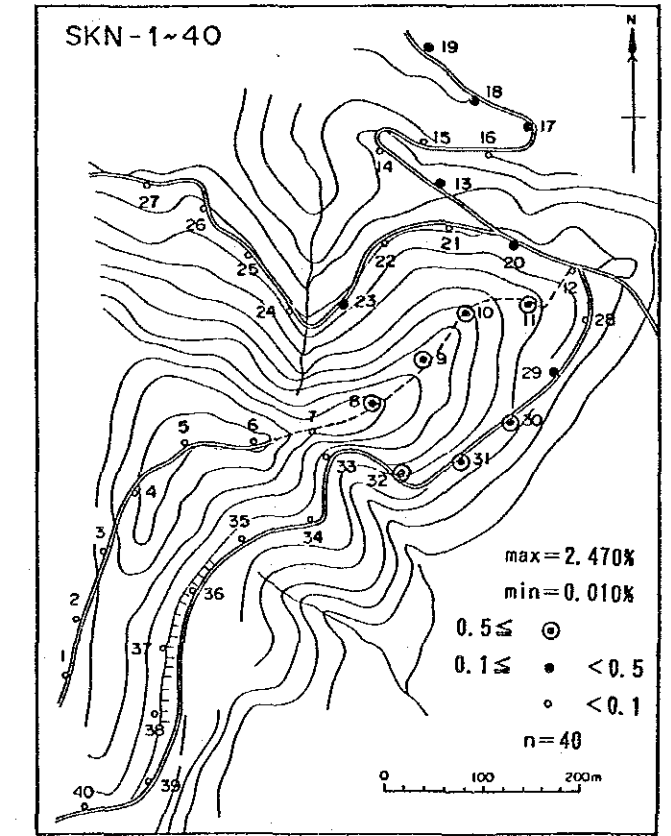


Figure GC-7 Distribution of 9 selected elements in soil from the Kinangoni area

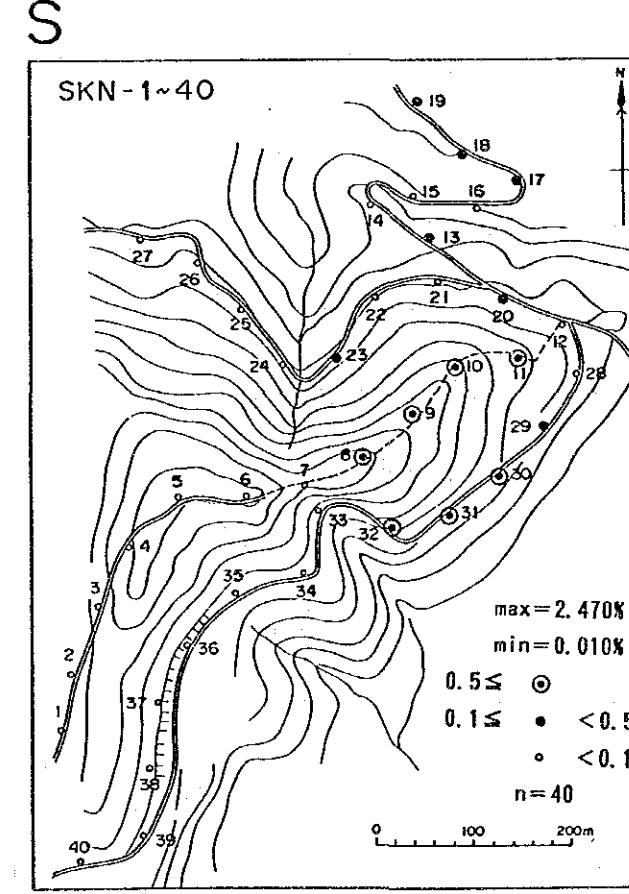
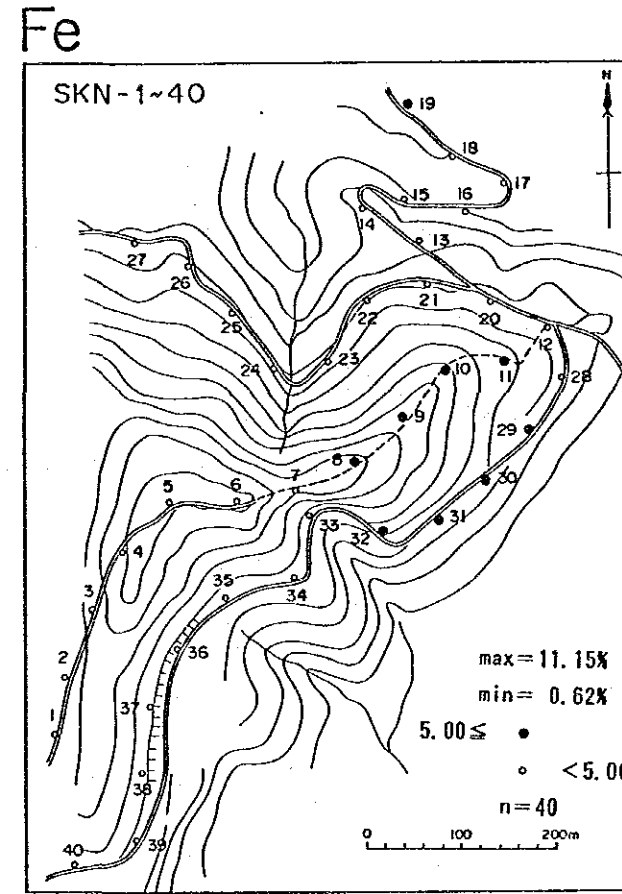
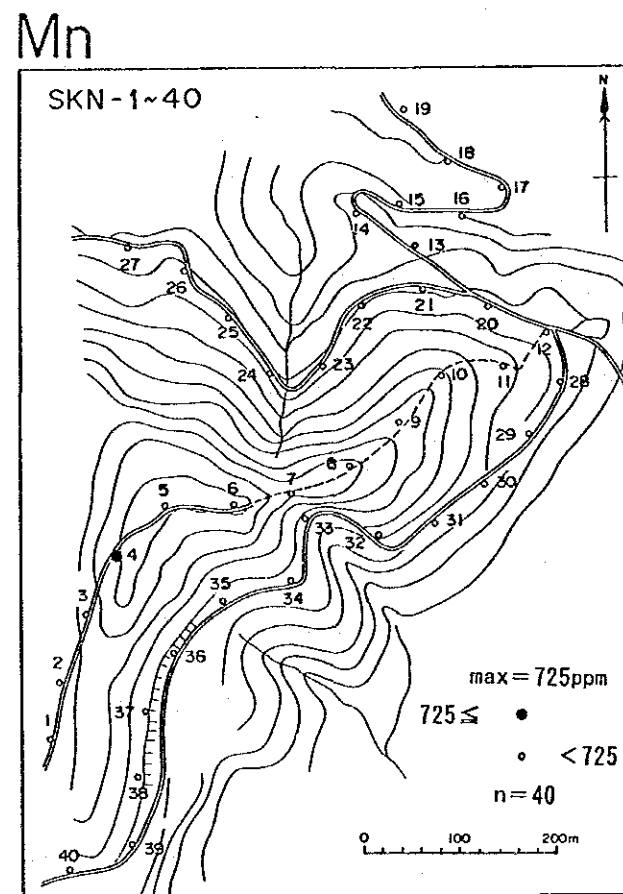
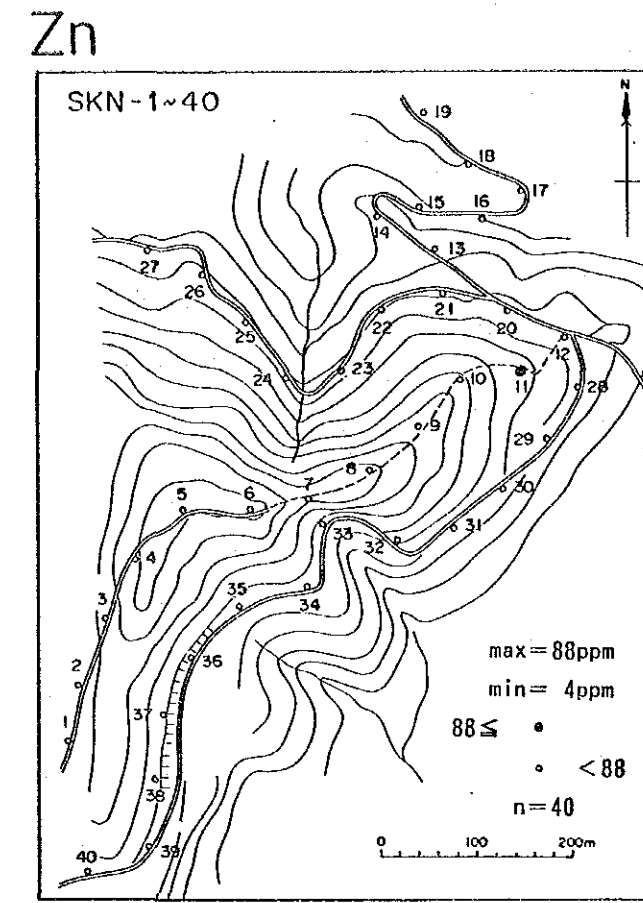
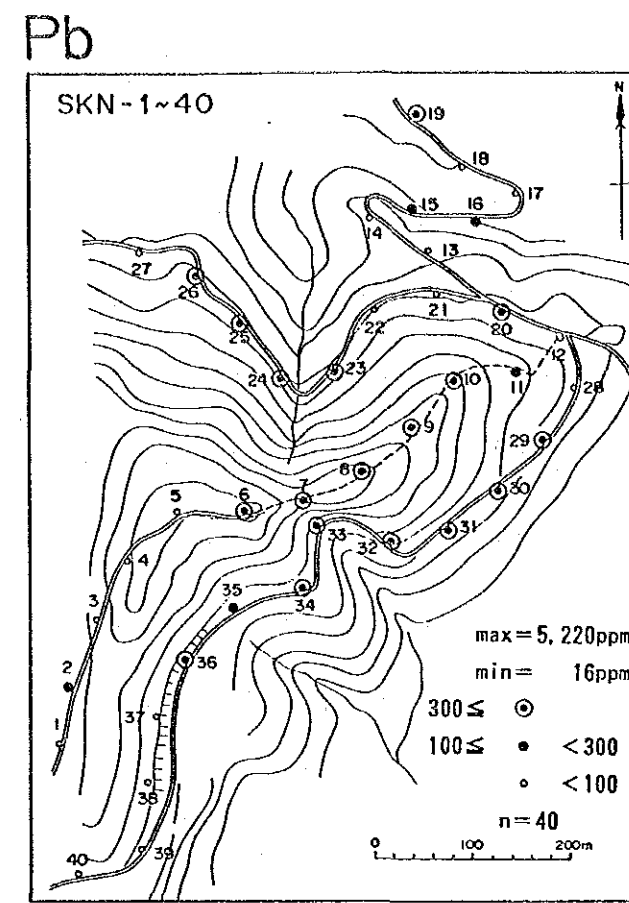
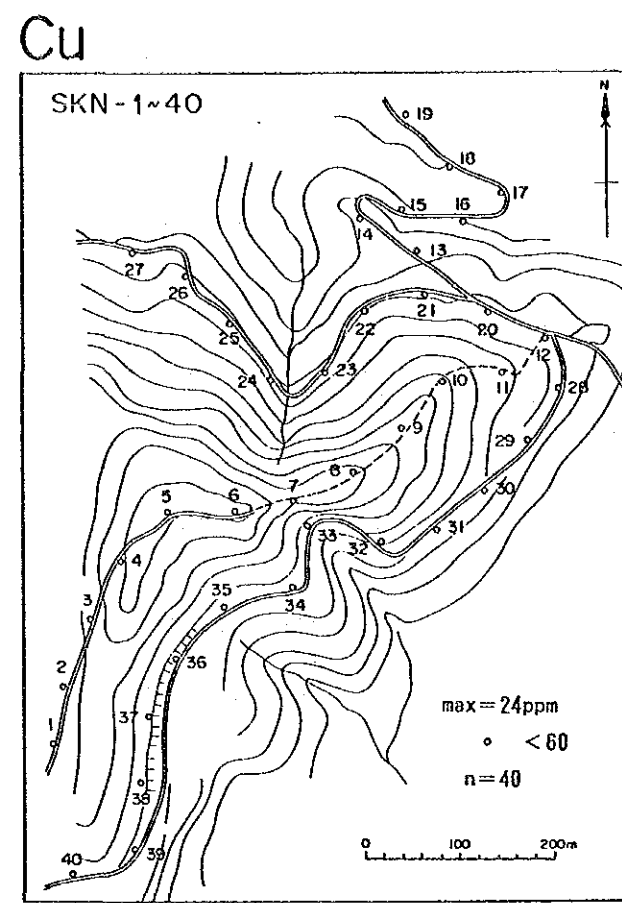
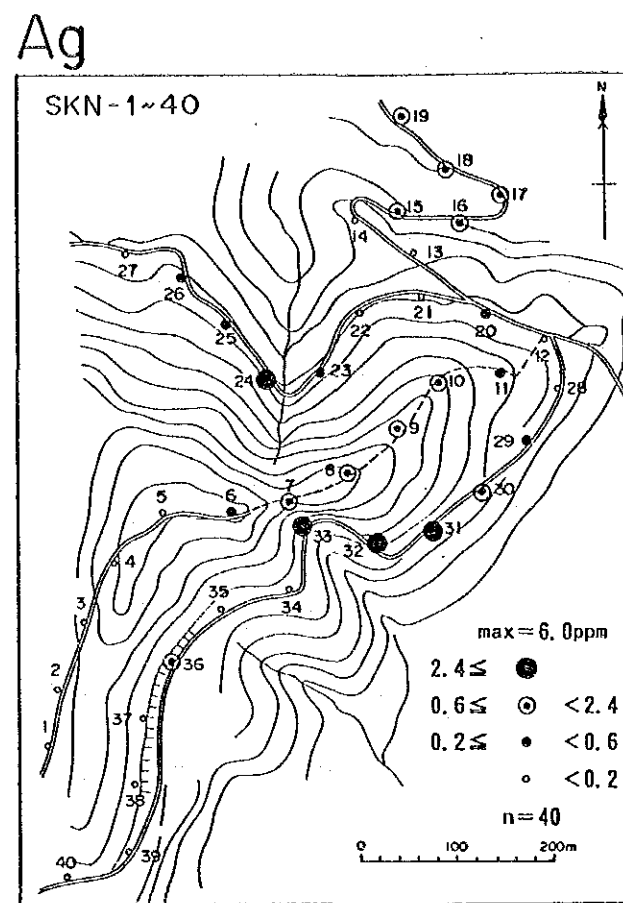


Figure GC-7 Distribution of 9 selected elements in soil from the Kinangoni area

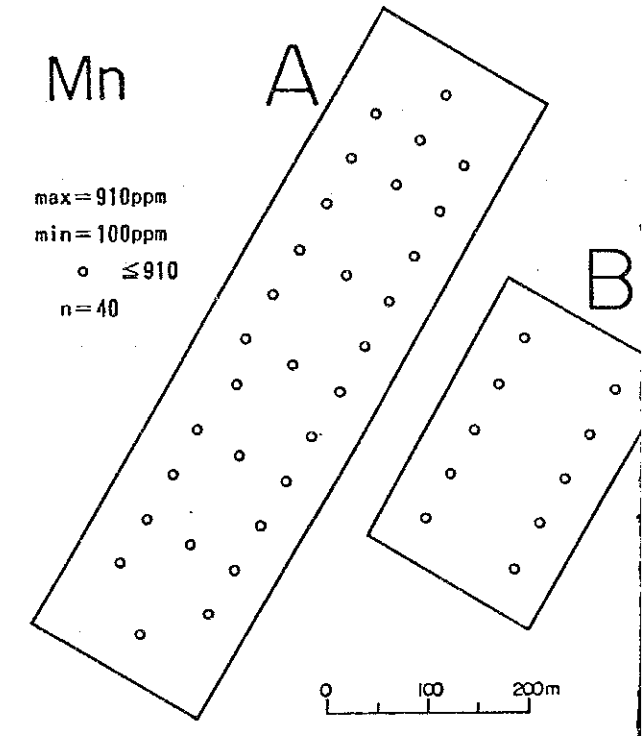
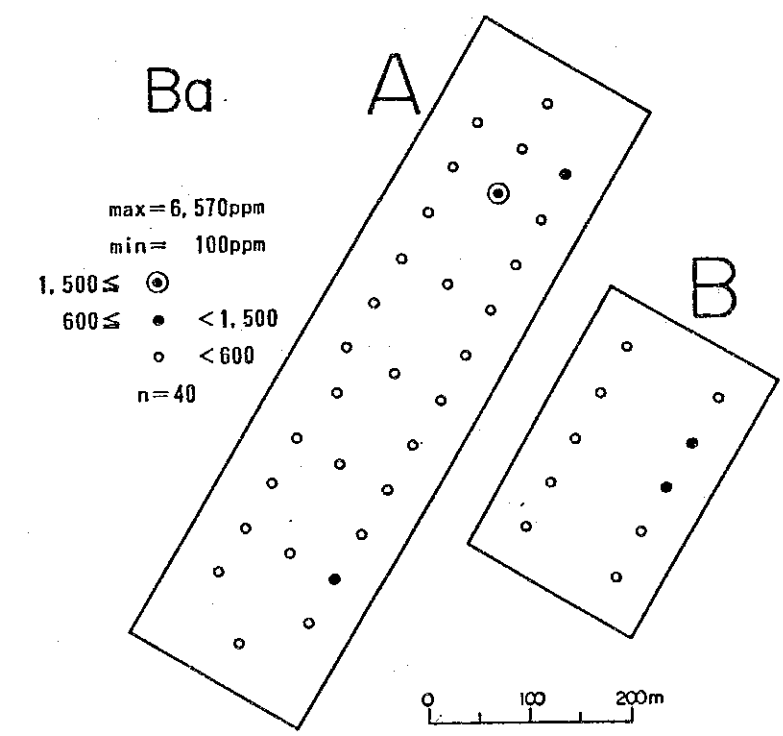
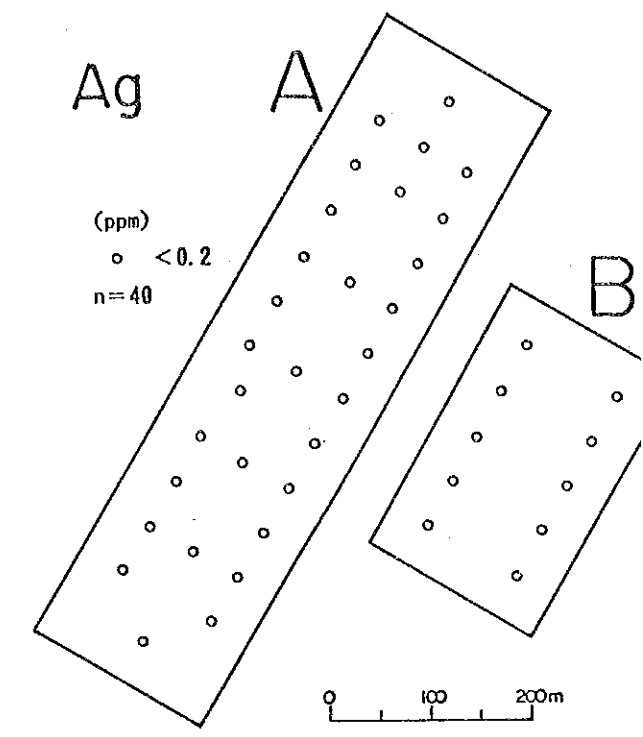
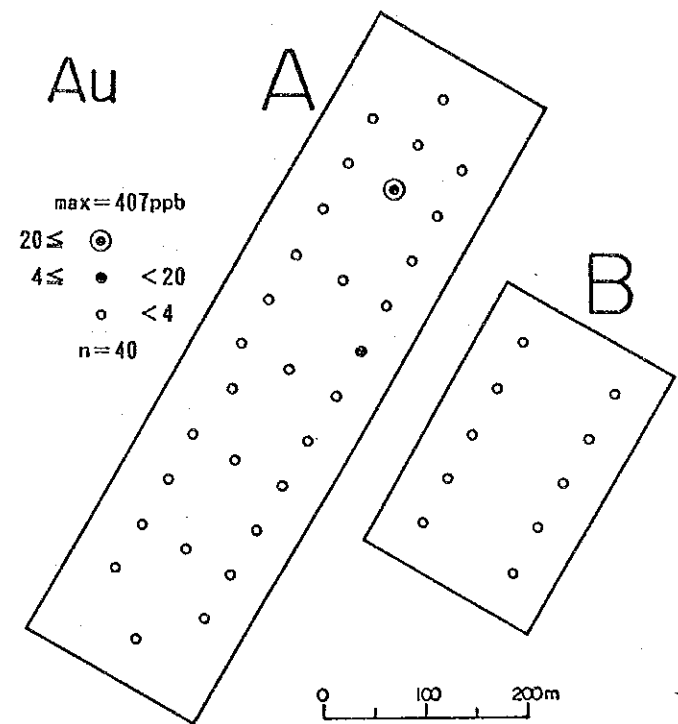
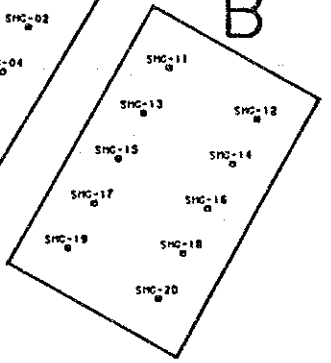
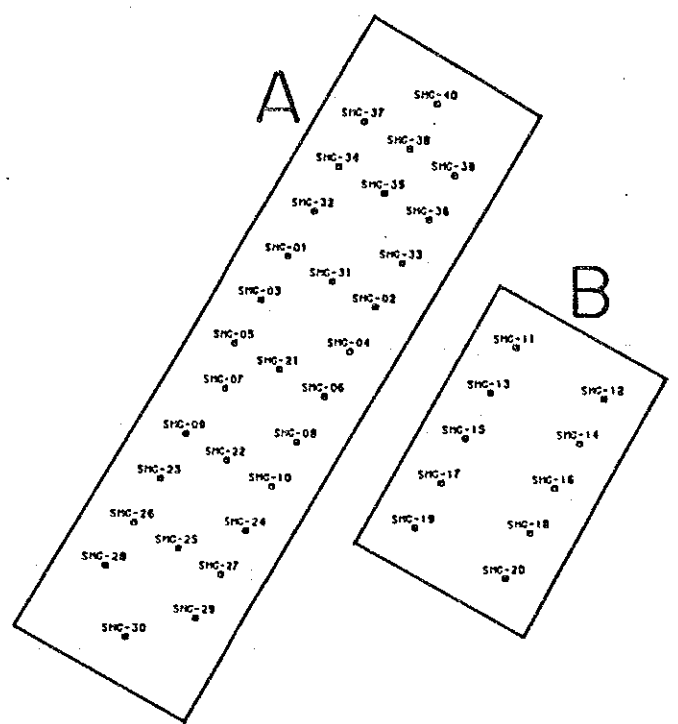
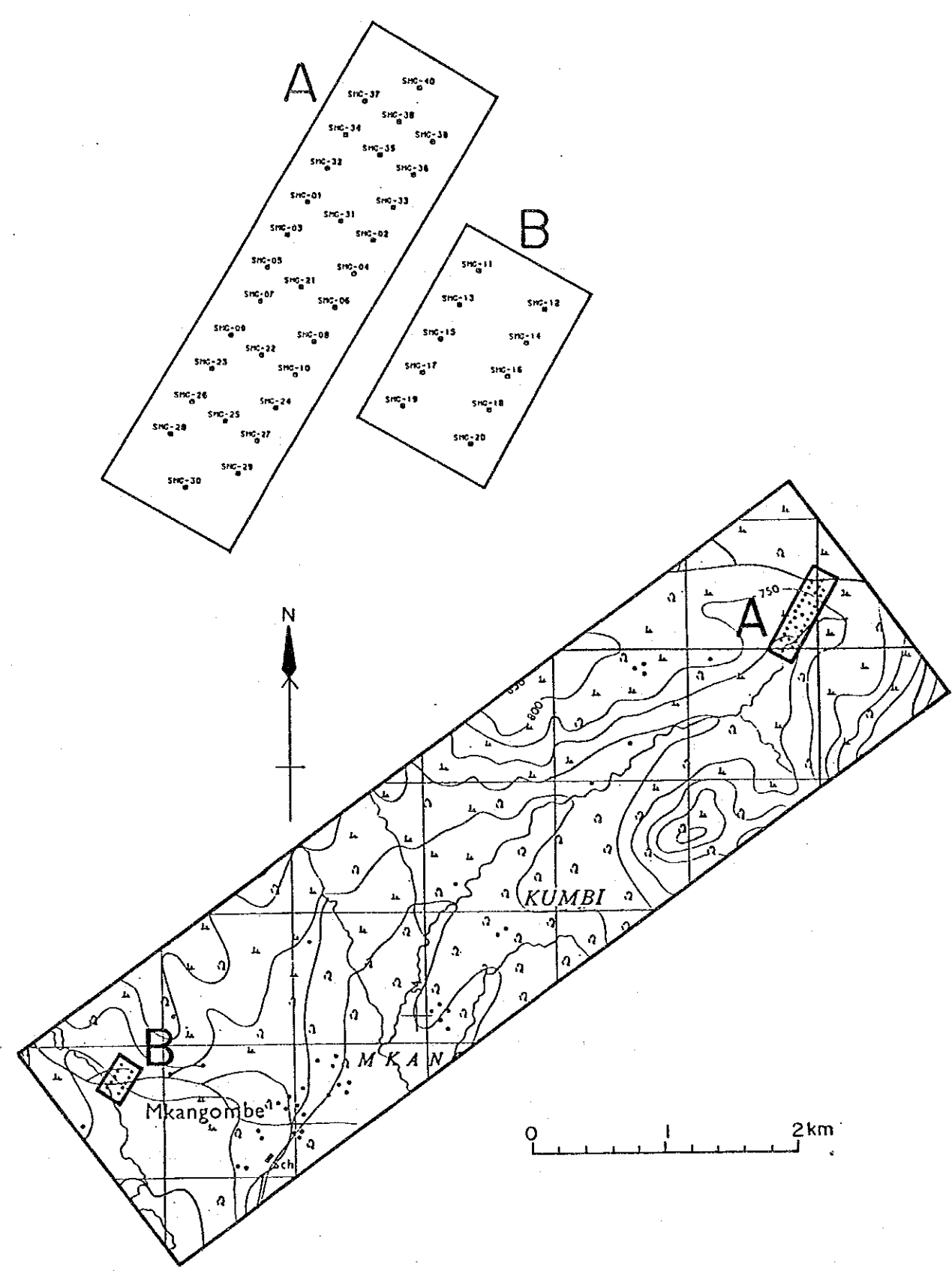


Figure GC-8 Distribution of 9 s

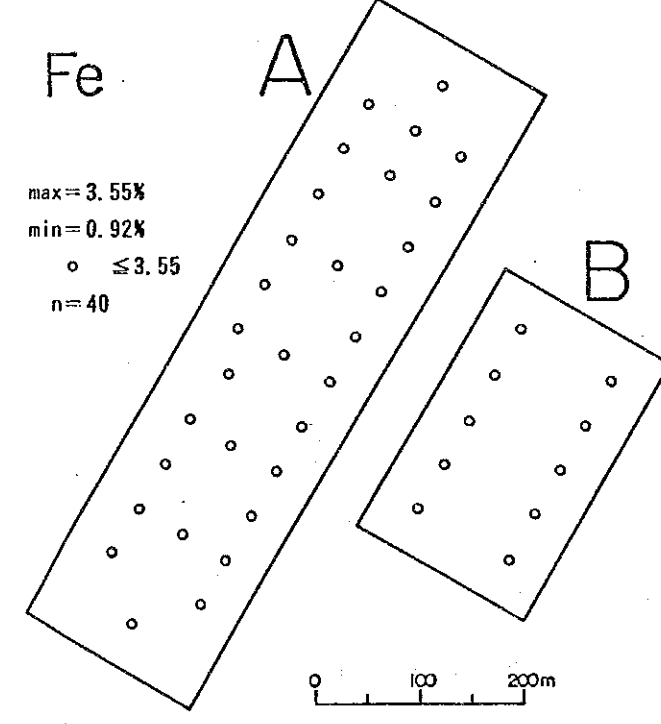
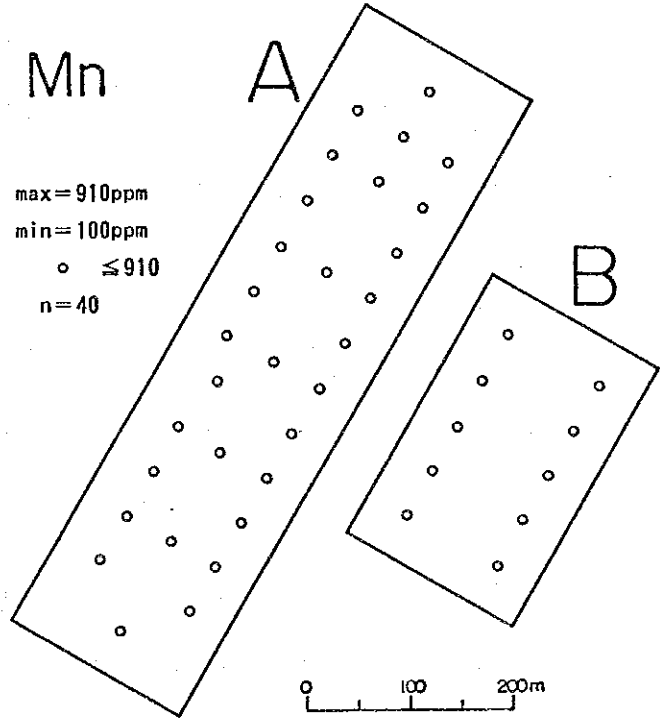
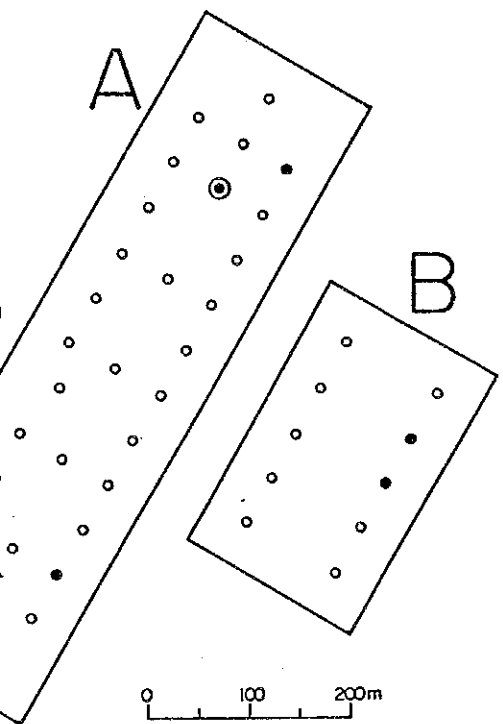
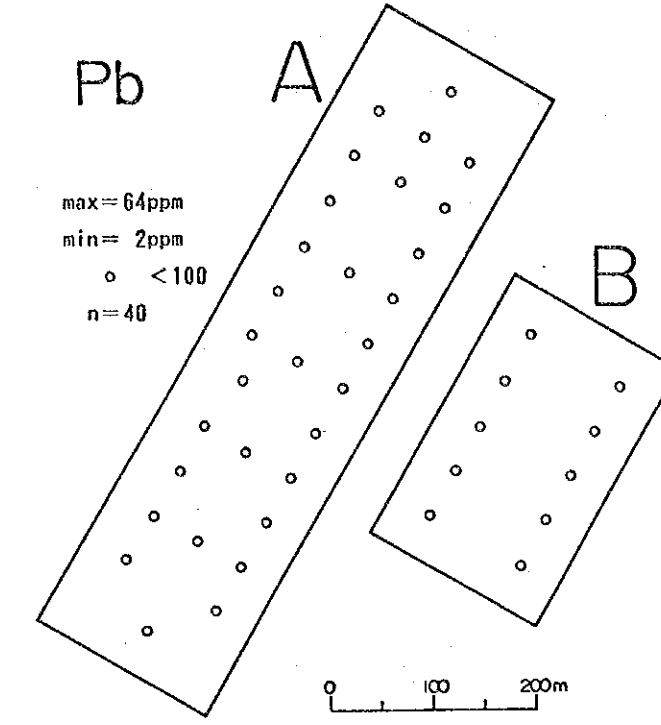
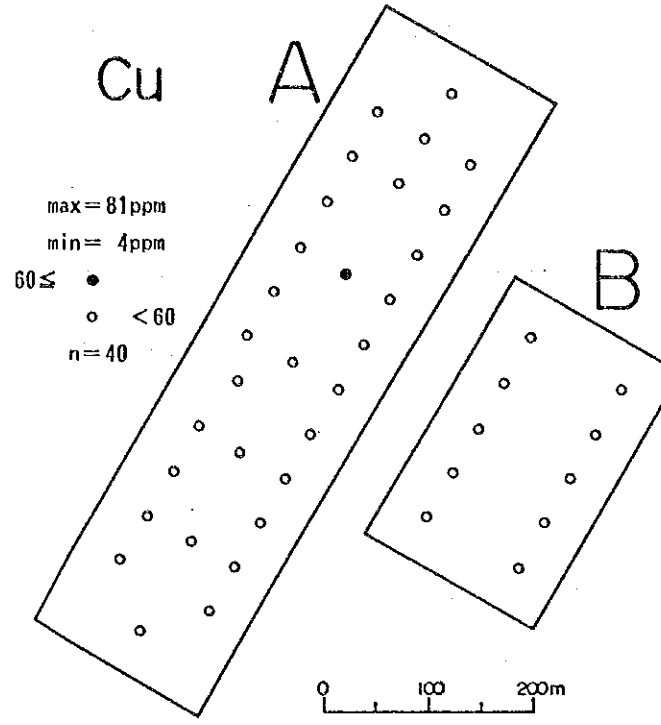
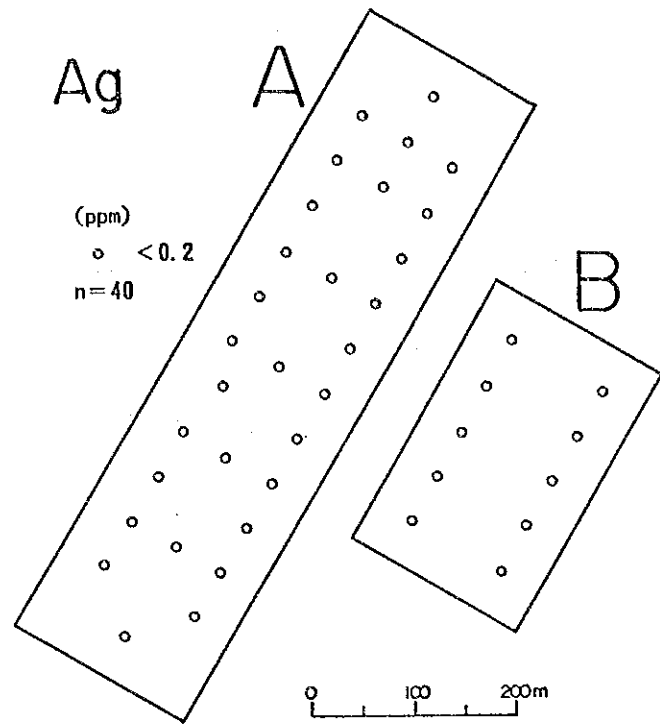
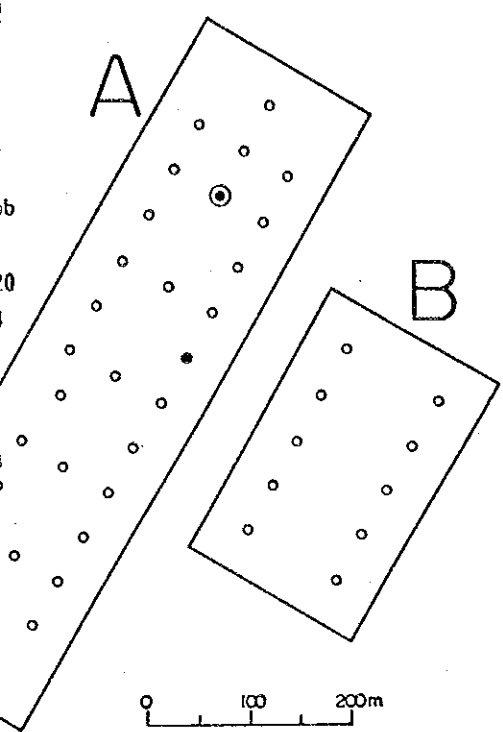
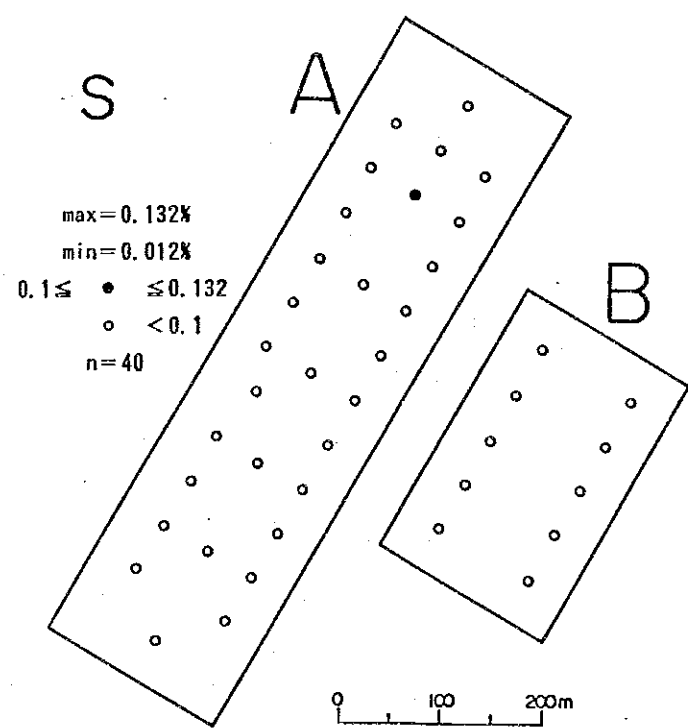
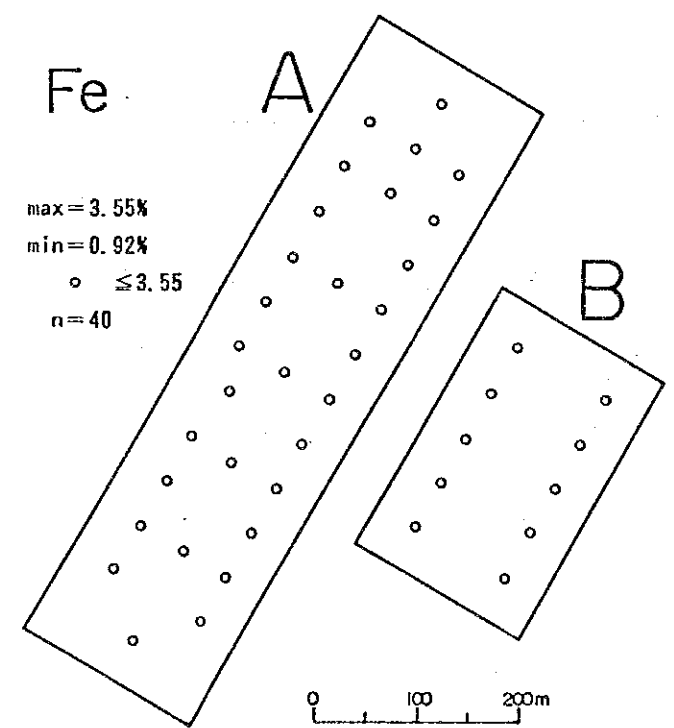
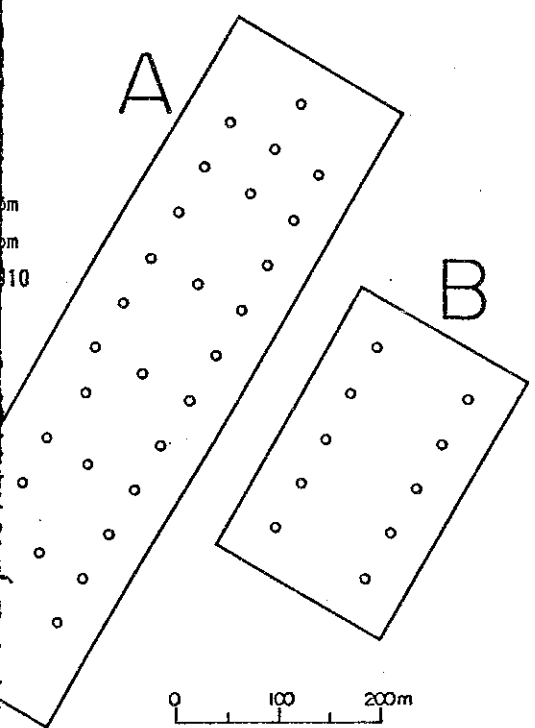
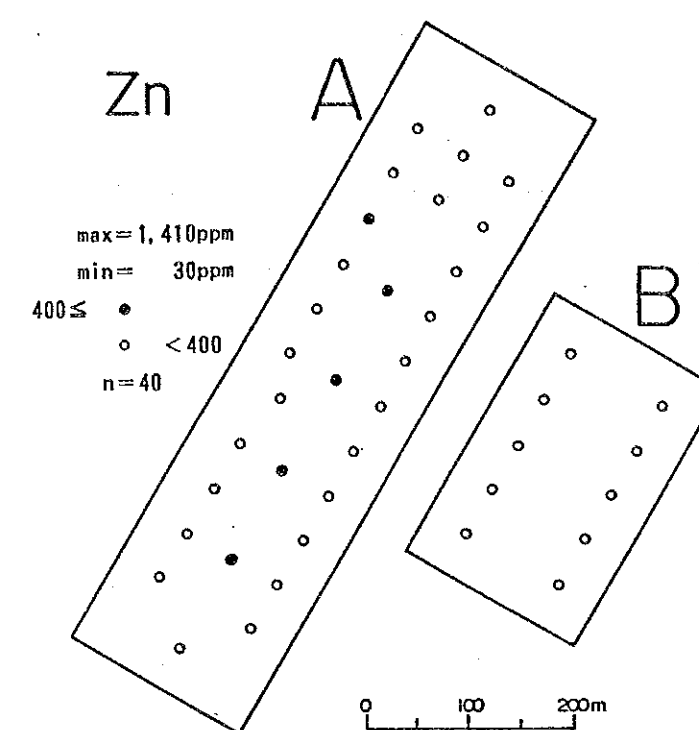
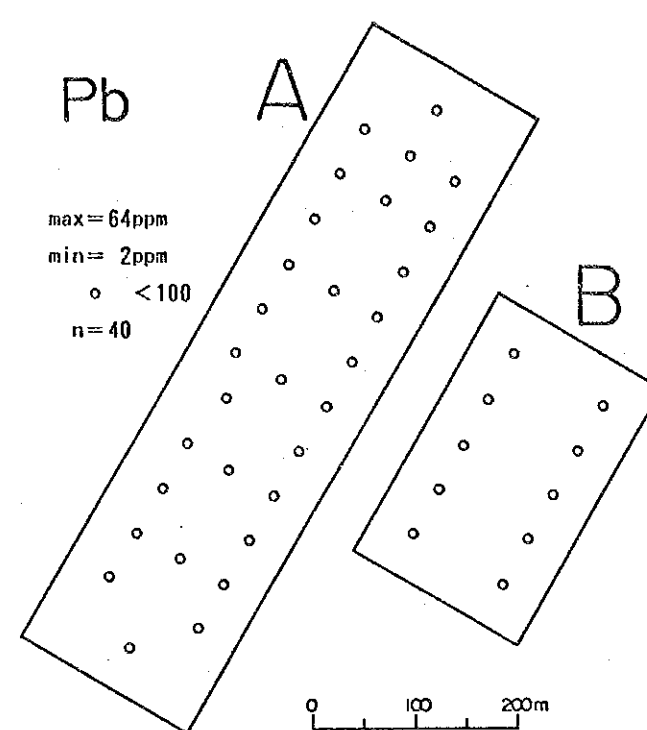
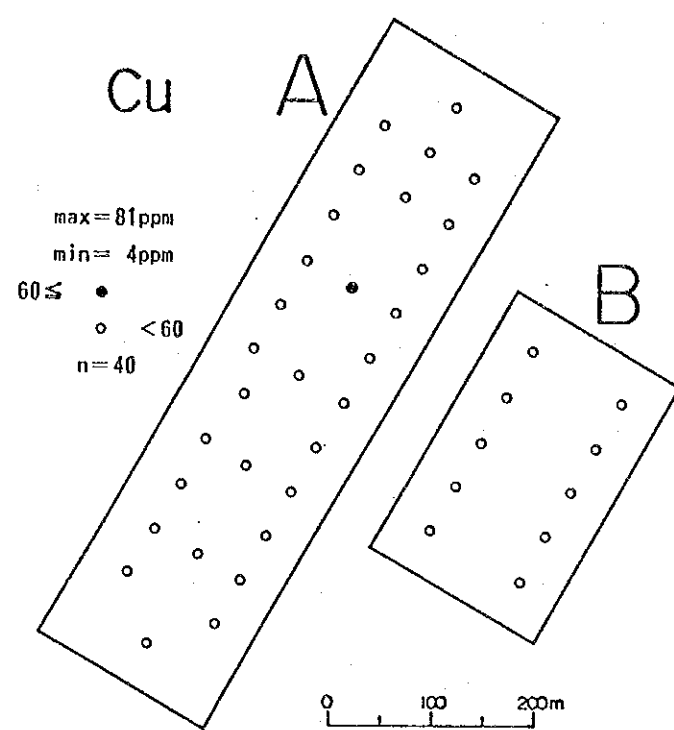
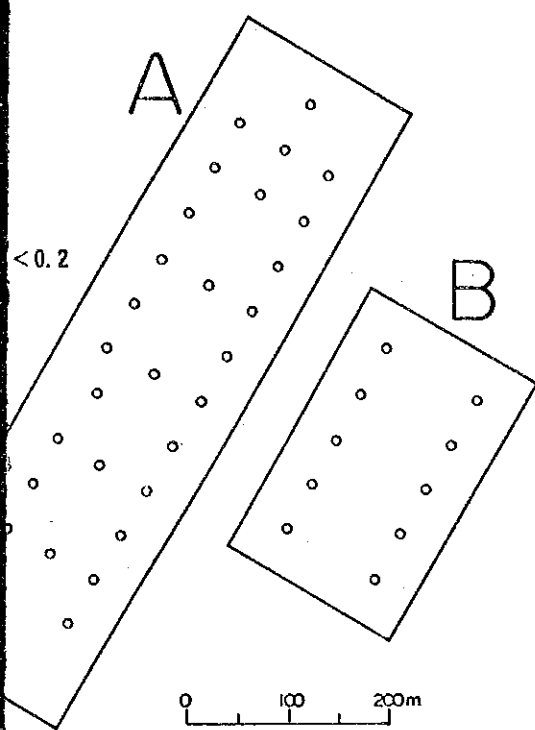


Figure GC-8 Distribution of 9 selected elements in soil from the Mkang'ombe area



C-8 Distribution of 9 selected elements in soil from the Mkang'ombe area

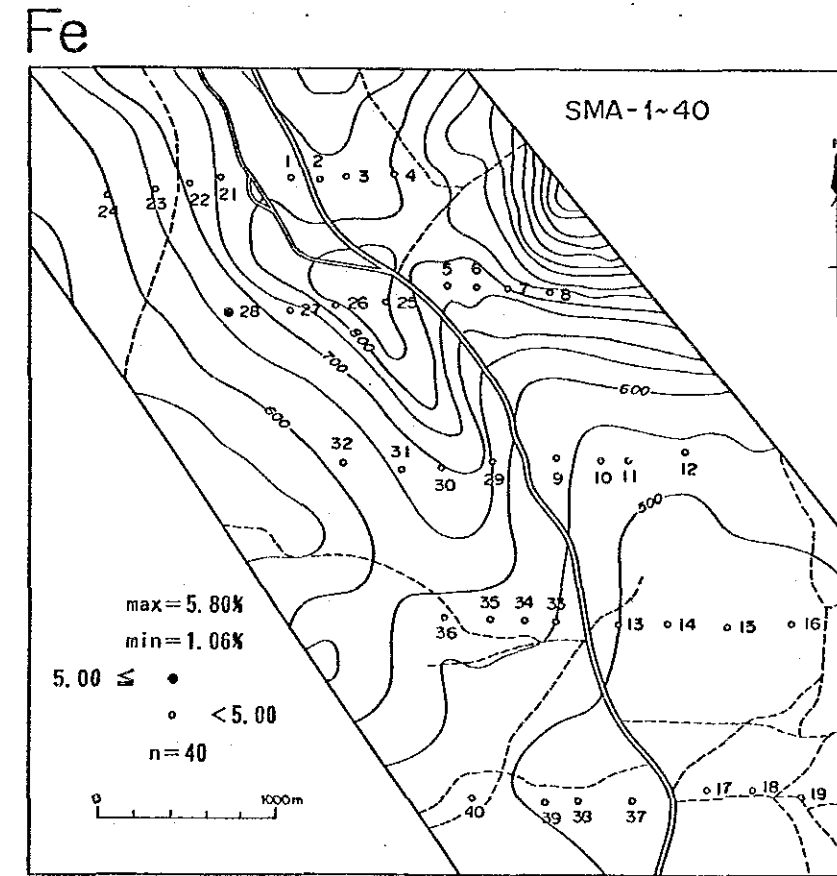
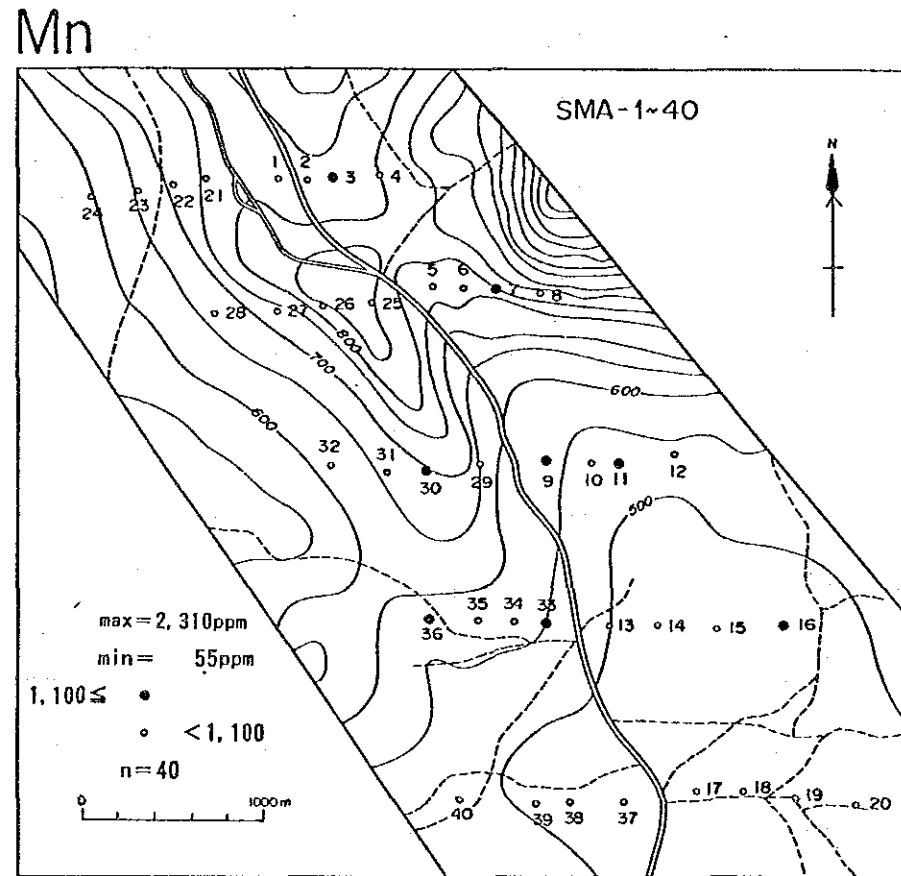
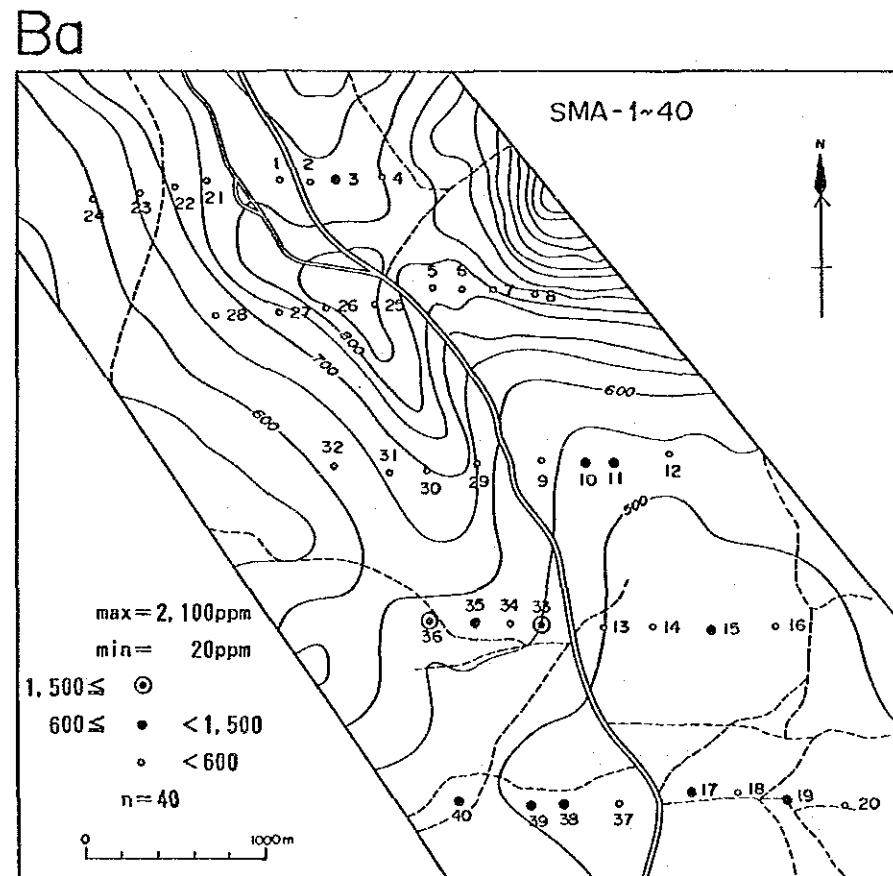
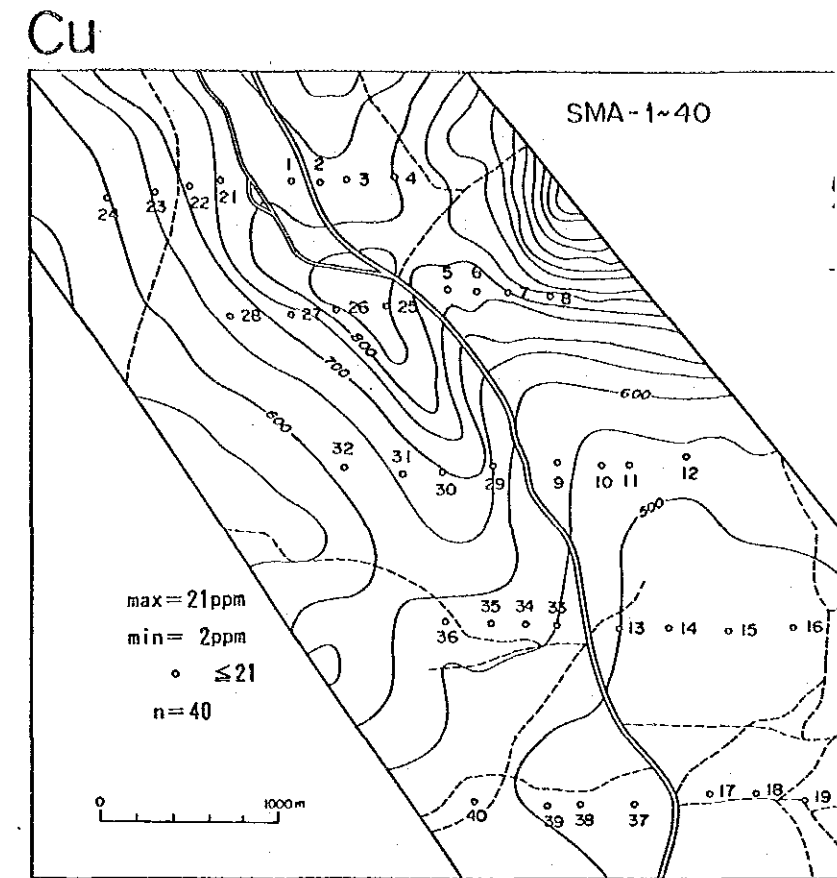
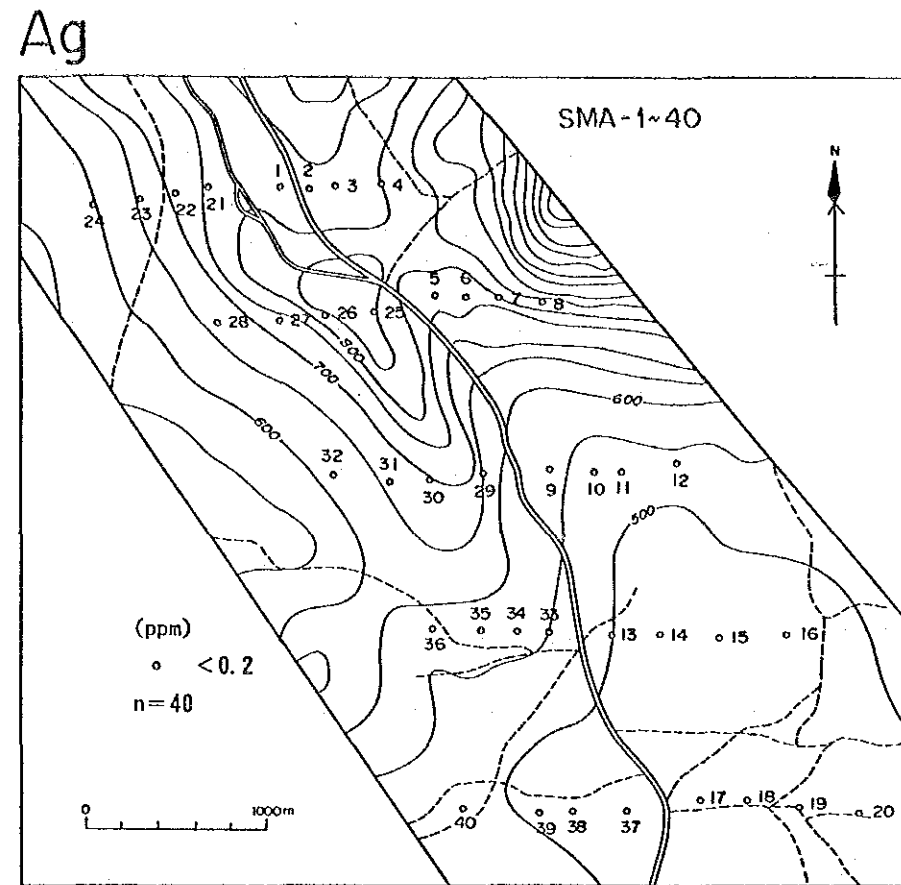
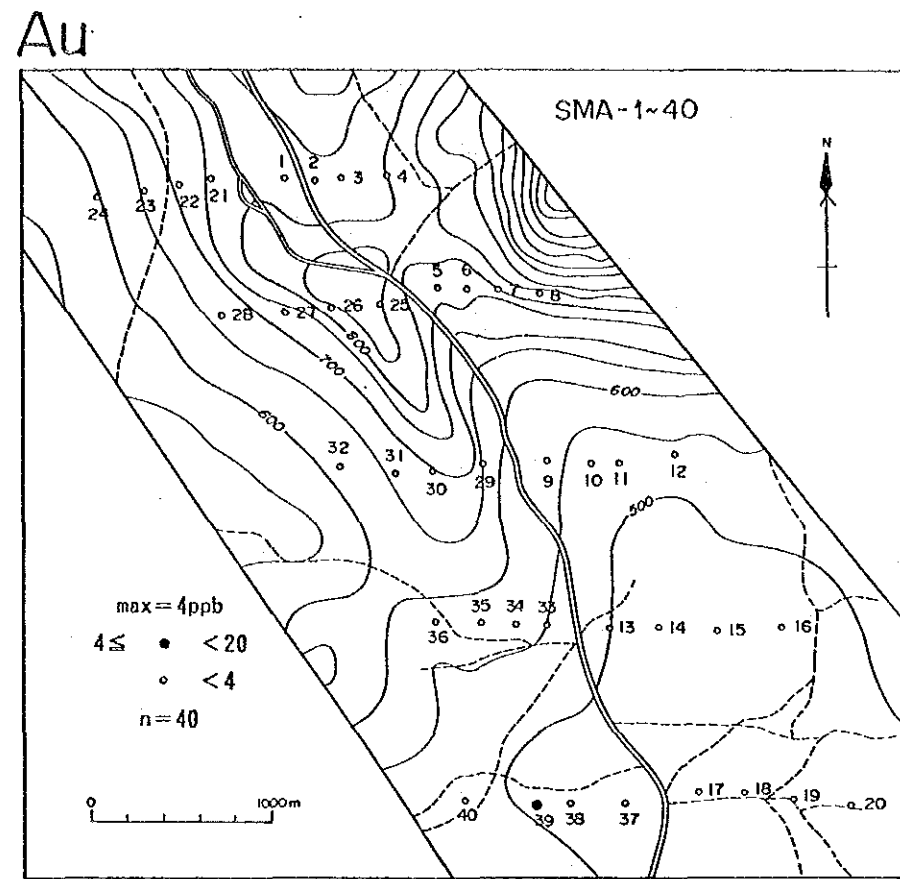
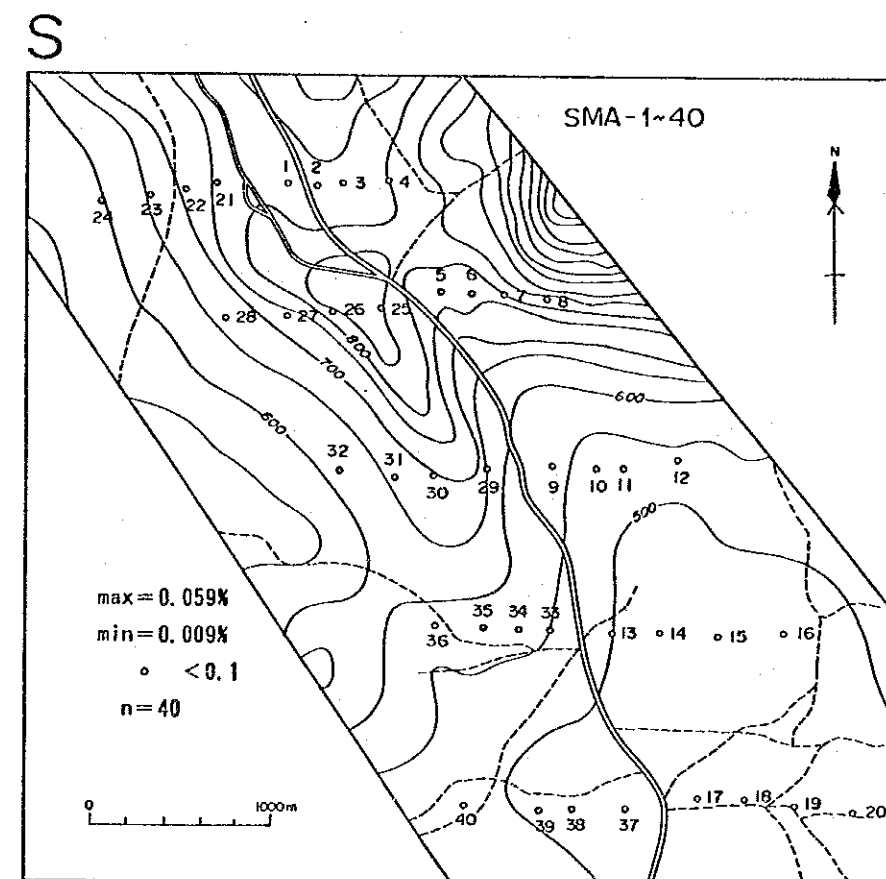
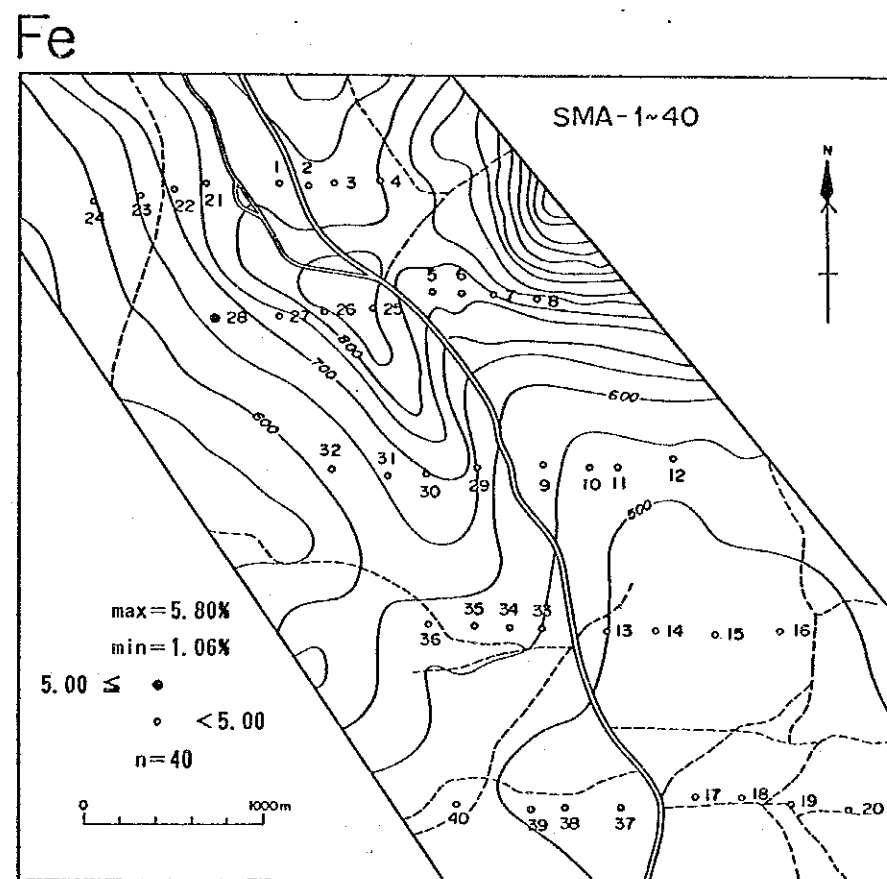
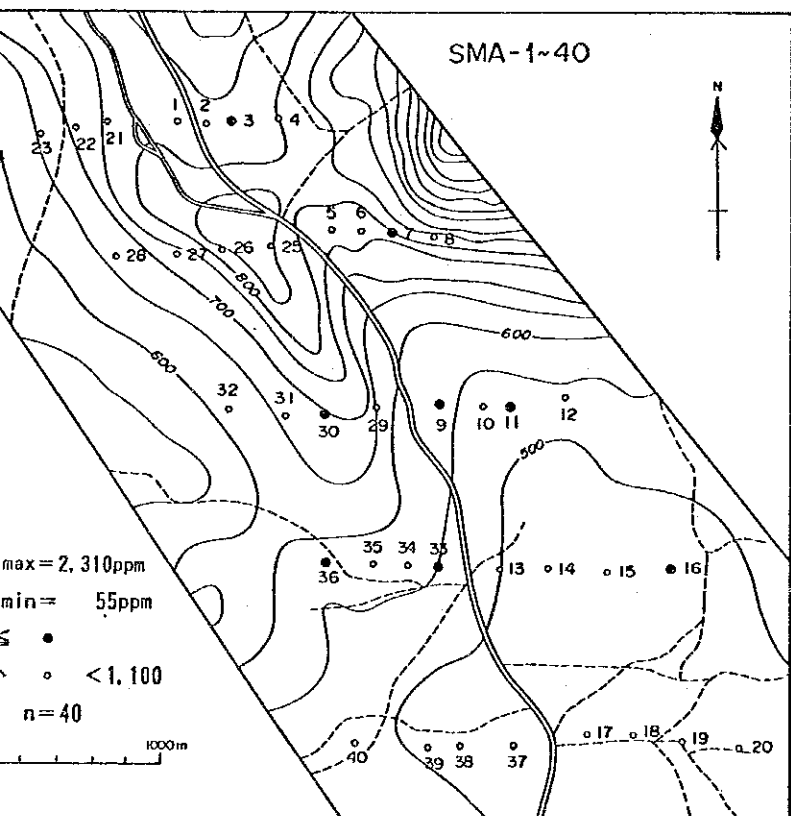
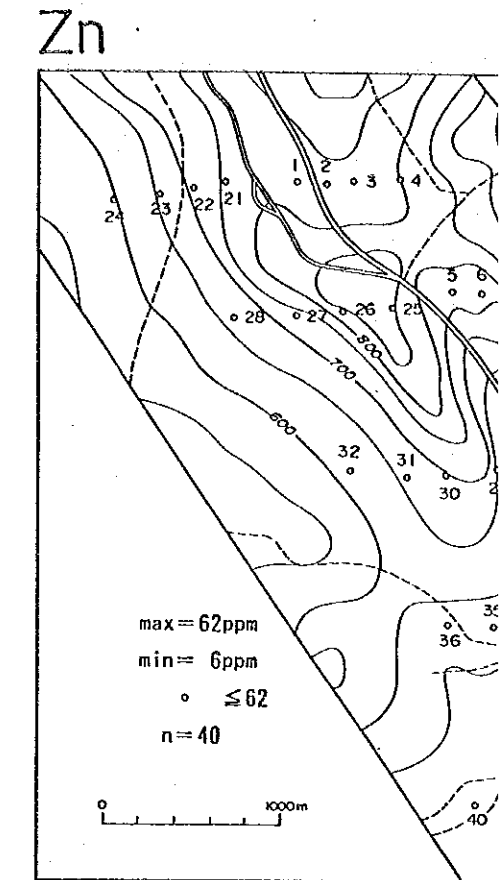
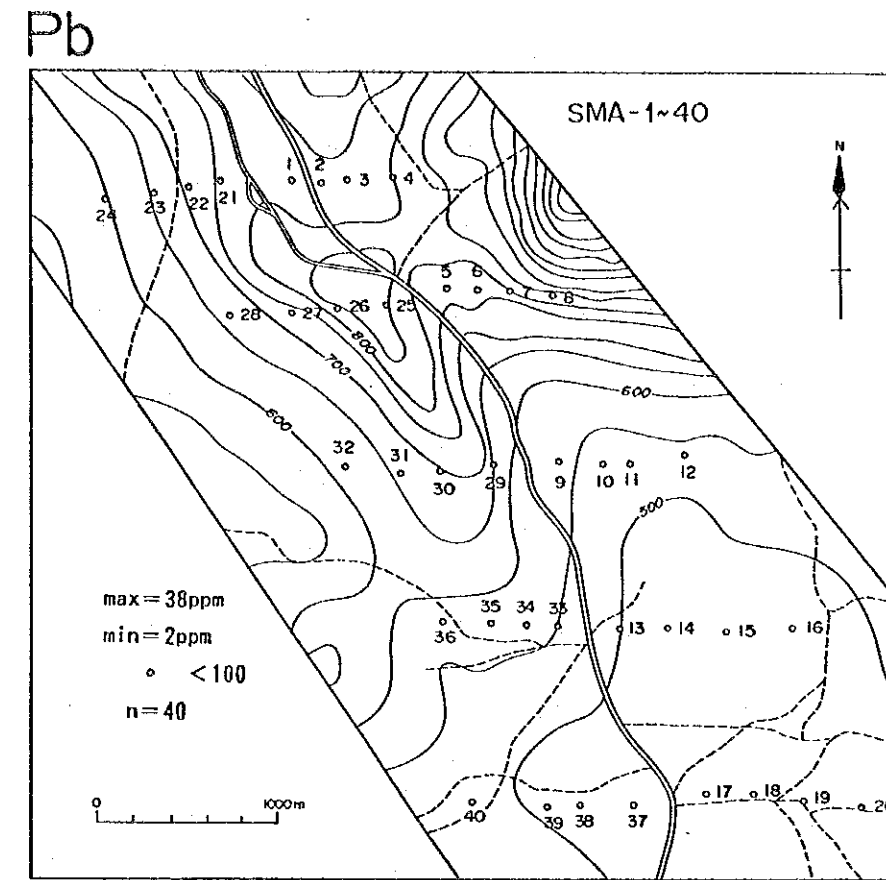
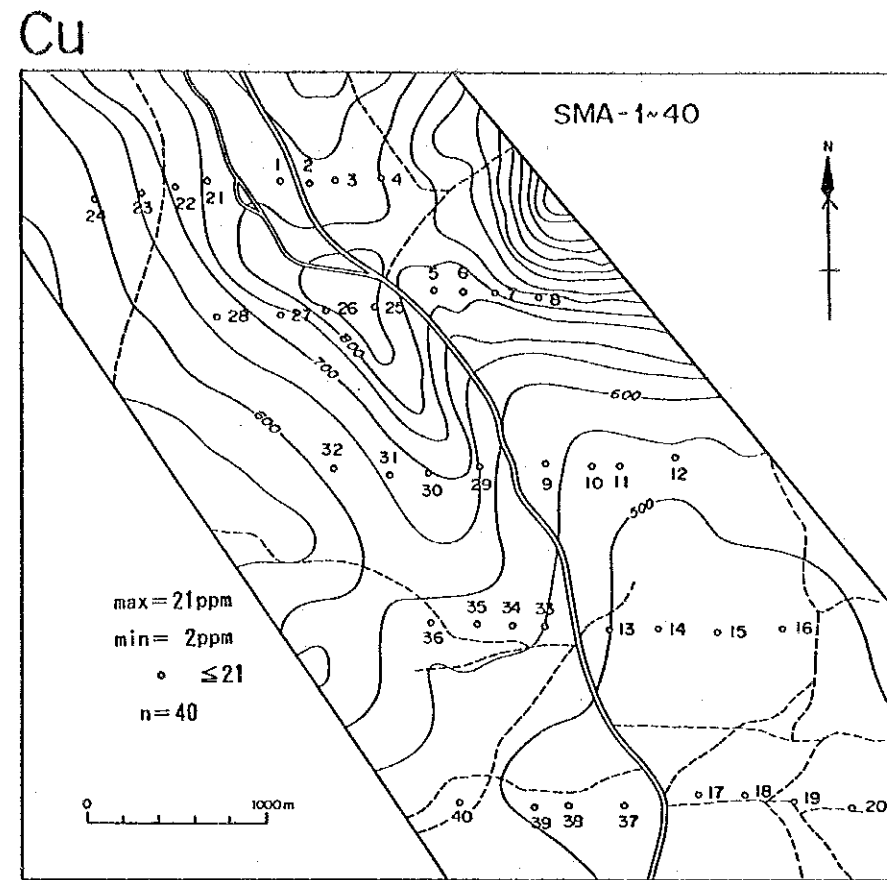
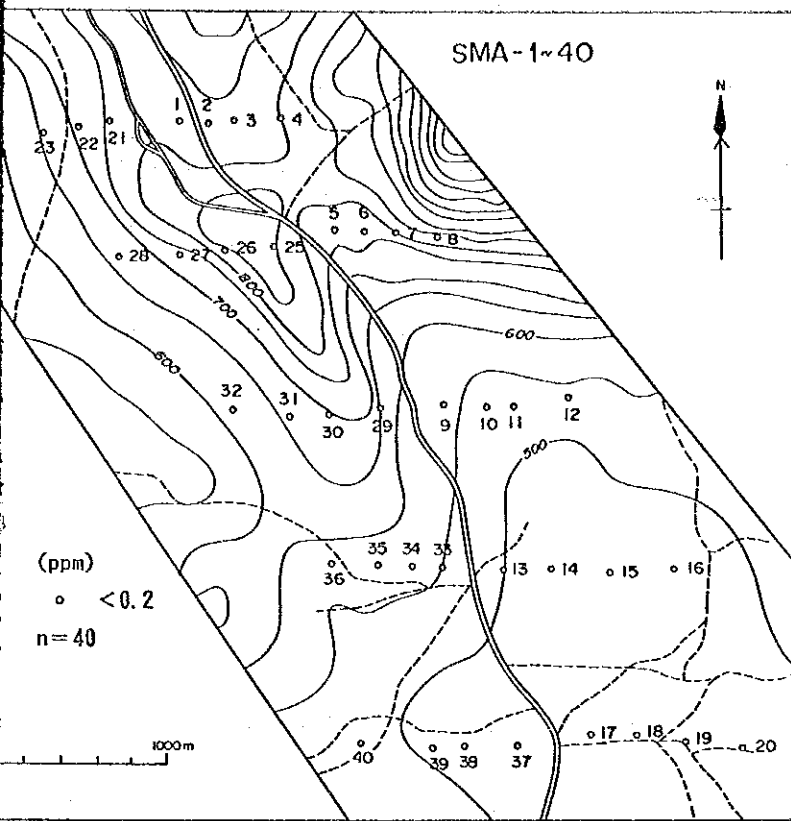
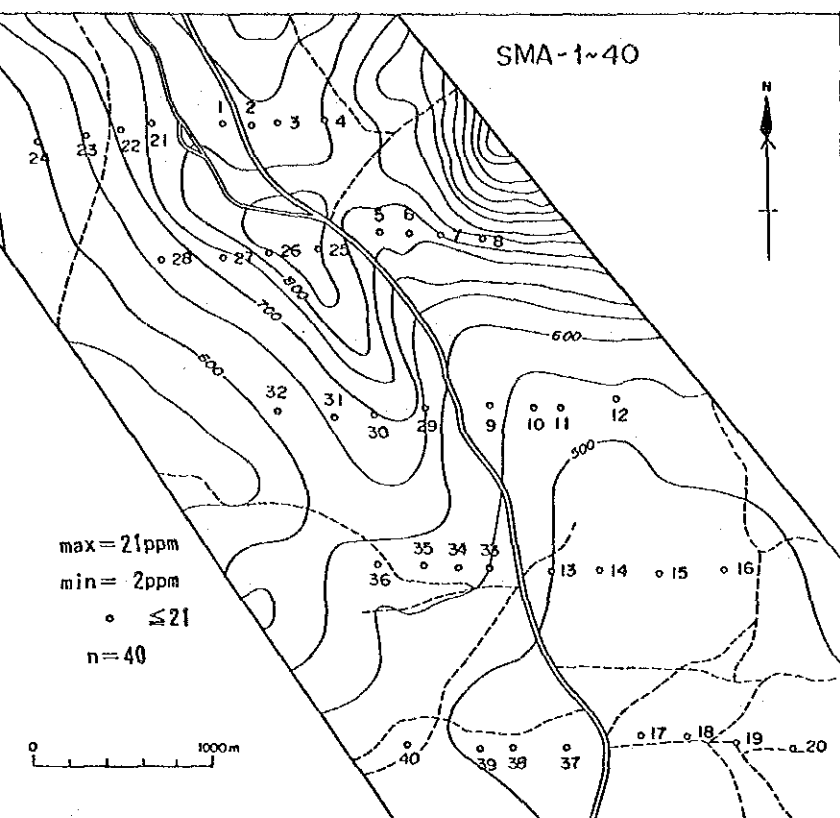


Figure GC-9 Distribution of 9 selected elements in soil from the Mangeda-Kwa Dadu area

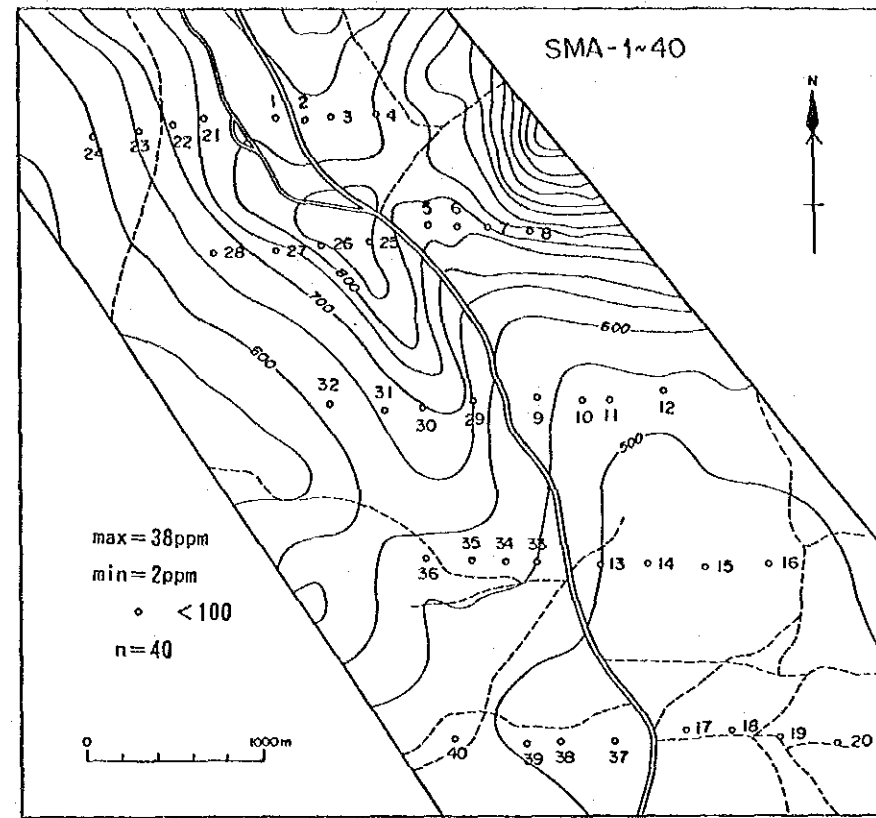


GC-9 Distribution of 9 selected elements in soil from the Mangea-Kwa Dadu area

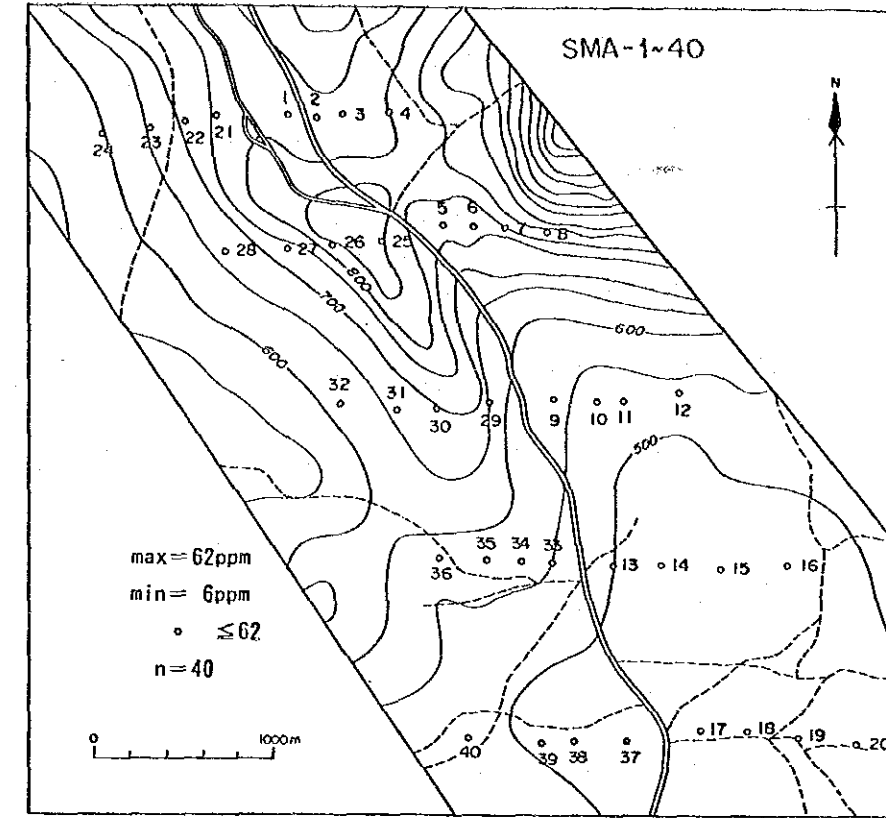
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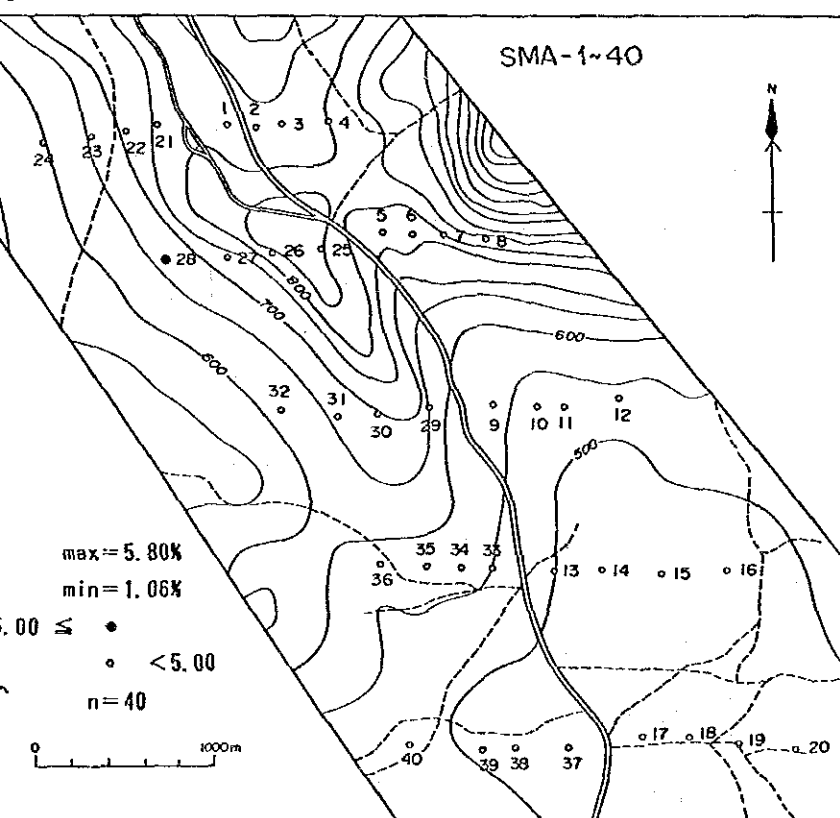
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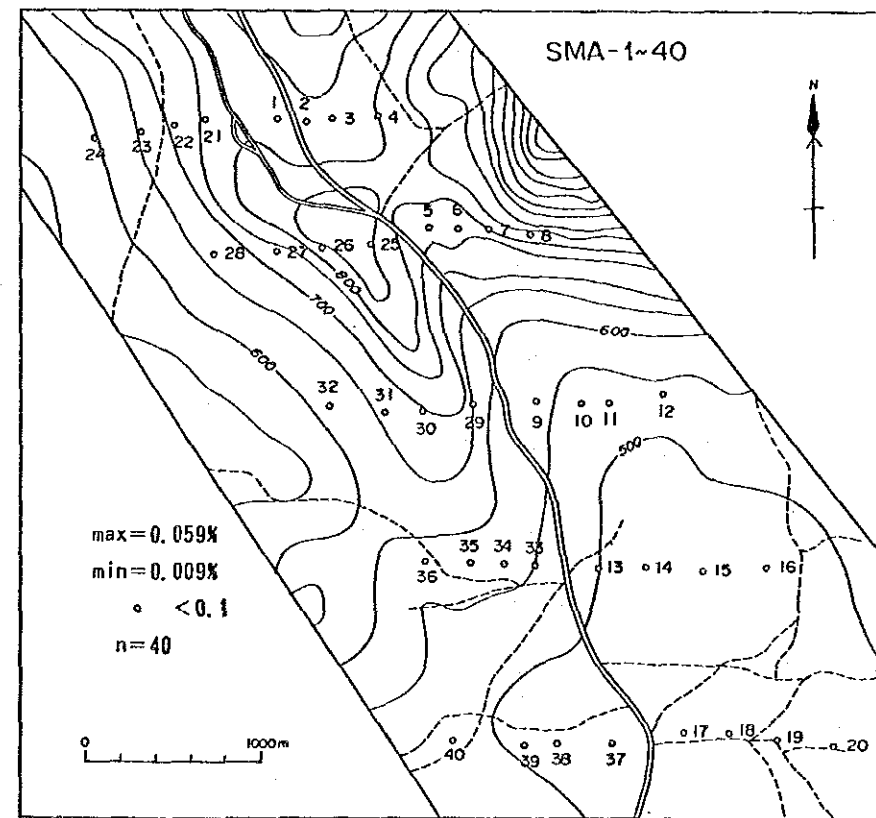
Zn



e



S



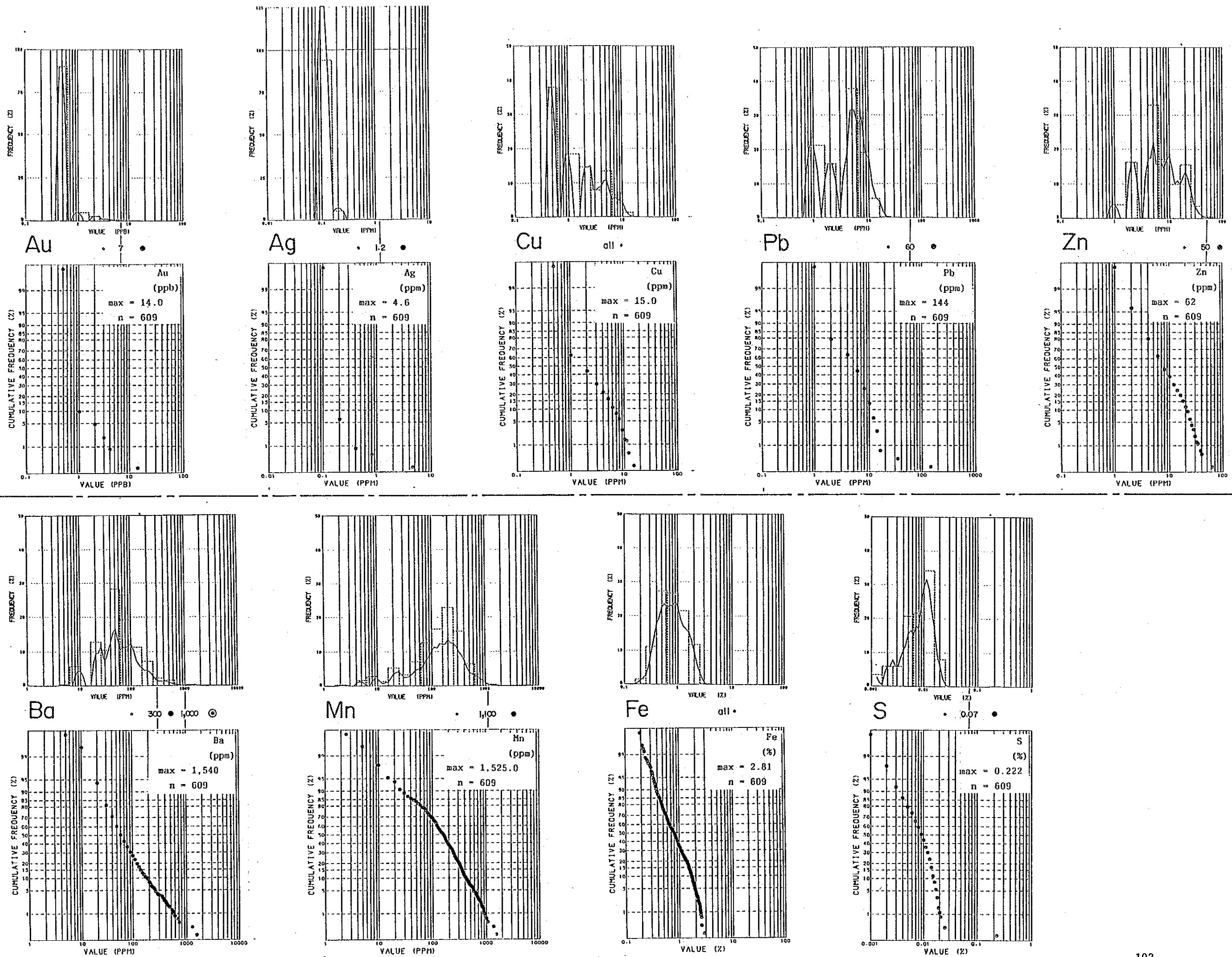


Figure GC-10 Frequency distribution and cumulative frequency distribution of 9 selected elements in soil from the Mkundi area

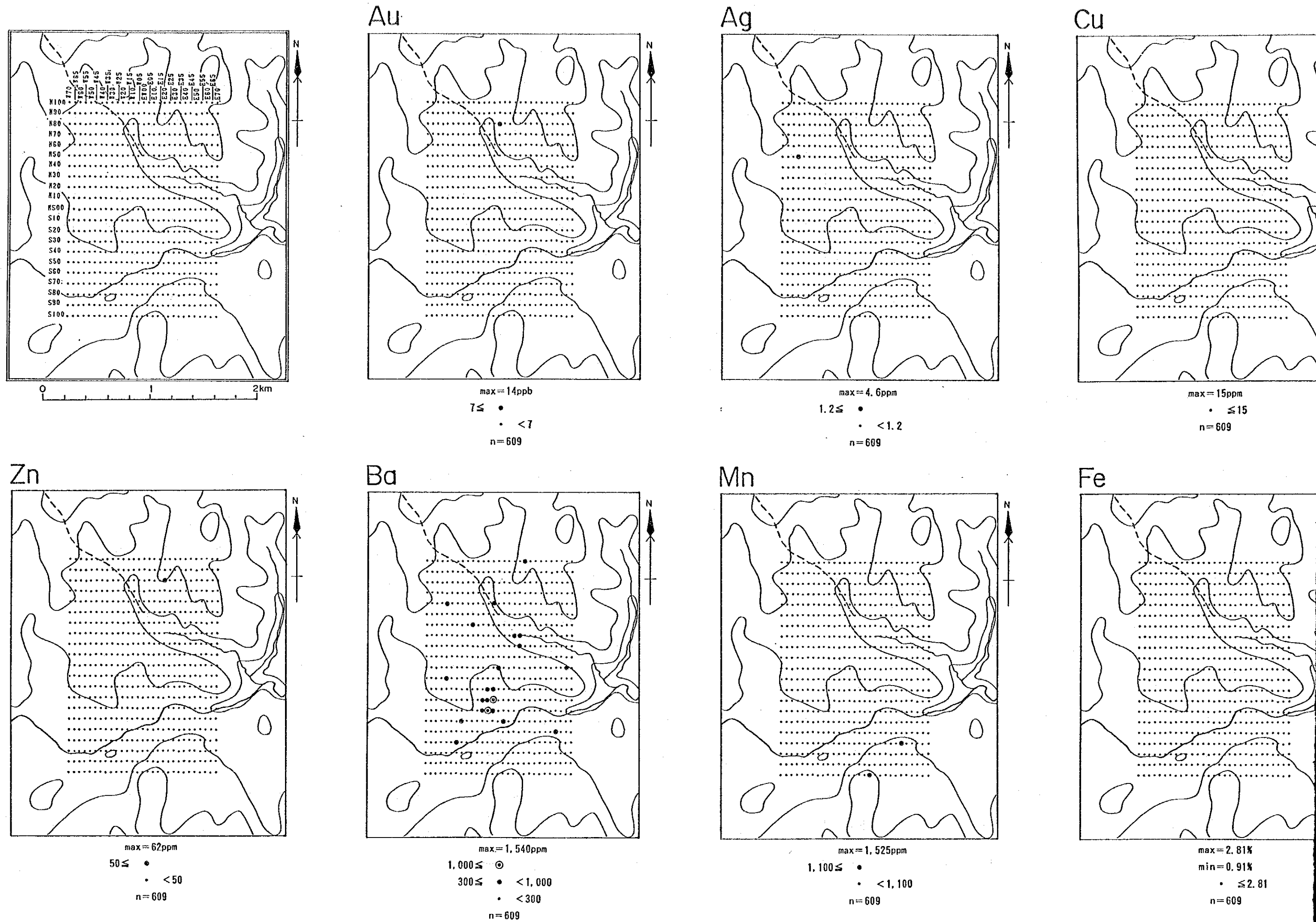


Figure GC-11 Distribution of 9 selected elements in soil from the Mkund

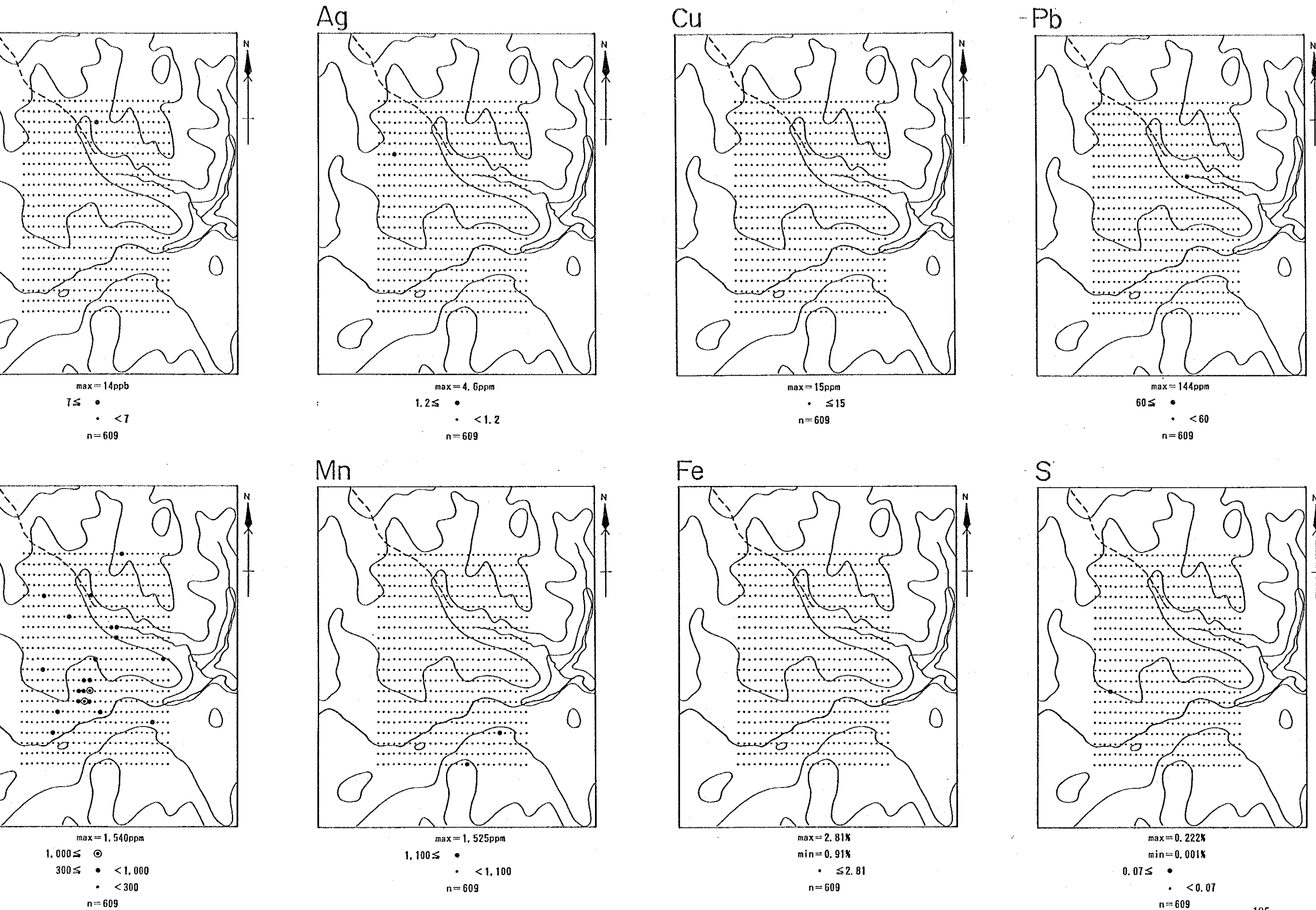


Figure GC-11 Distribution of 9 selected elements in soil from the Mkundi area

第Ⅲ部 結論及び提言

結 論

今回の調査結果の結論としてつぎの諸点を挙げる。

(1) Mrima Hill-Jombo Hill 地区にはニオブウムを伴う稀土類酸化物が Mrima Hill カーボナタイト・プラグからもたらされた残留土壌中に濃集している。この鉱床は、この種の資源に関して、世界的な重要鉱床のひとつに数えられている。しかしながら、ケニア共和国政府認可の鉱業権は、これまでに採掘の実績はないものの、現在、外国の私企業にある。

(2) 断層規制の鉛-亜鉛-銀-重晶石熱水鉱化作用は、海岸線と平行な主断層帯と密接な関連をもっている。この鉱化作用の鉱物組合せ及び構造規制要素から、この鉱化作用はミンシッピ・バレー型の鉛-亜鉛鉱化作用類似のものといえる。本調査地域内でのこの型の重要な鉱床/鉱化帯は、現在までに、Vitengeni, Kinangoni, Mwachi River及び Lunga Lungaにある。これらの鉱床/鉱化帯のうち、Vitengeni 及び Kinangoniは稼行中の鉱山であり、前者では重晶石、後者では鉛を採掘している (Figure 7.8)。

(3) 河床堆積物パンニング試料による地化学探査結果によれば、地化学異常の多くは海岸線と平行する主断層帯近傍に集中している。これらの異常のうち、既知の鉱化帯近傍にあるもの、例えば、Vitengeni周辺の多金属異常、Vitengeni 南方の金の異常、Kinangoni 周辺の銅、鉛、及び/又は亜鉛異常、及び Mkang'ombe 周辺の金及び/又は銅異常は特に重要な示徴である (Figure 7.8)。

(4) 土壌地化学探査結果は、Mrima Hill-Jombo Hill 地区及び Mkang'ombe 地区を除き、概して、失望させるものであった。Mrima Hill-Jombo Hill 地区からの土壌試料は、そのほかの地区と比較して、金、銅、鉛、亜鉛、マンガン、鉄、及び硫黄について顕著に高い値を示した。Mkang'ombe地区では、試料のひとつが金の鉱化を示唆する例外的に高い金の値 (407ppb) を示した (Figure 6)。

提 言

上述の結論から、今後の調査として、下記の調査の実施を提案する。

(1) Mrima Hill, 稀土類元素及びニオブウムのみならず、土地化学探査結果によれば、卑金属及び貴金属についても興味ある探鉱地である。しかしながら、鉱業権が外国の私企業にあることを考慮して、本プロジェクトの枠内での今後の調査について、現時点での提案は行わない。

(2) 河床堆積物パンニング試料による地化学異常から、つぎの4地区が今後の調査対象として抽出できる；Vitengeni, Ganze (Kilifiの西方, Mulungu wa Mawe 川の上流), Kinangoni, 及びMkang'ombe。前者3地区は海岸線にほぼ平行の主断層帯近傍に位置している。従って、これら3地区の調査は主断層帯及び地化学異常地を含む範囲で行うことが必要である。

(3) 鉱徴地についての今年度調査では精密調査の対象となるようなターゲットは特定できなかった。主としてパンニング試料による地化学探査結果に基づいて抽出した上述の4ターゲットに対する調査は、それぞれ、200～300km²程度の範囲をカバーすることが必要である。それは、今年度のパンニング試料による調査の密度が100試料/9,000 km²であったことから、今後の調査は半広域又は半精密の調査段階にあるためである。

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APPENDIXES

APPENDIXES

- Appendix- I -1 Bibliography on Geology and Mining of the Coast Province, Kenya
- Appendix- I -2 Technical Archives of Mines and Geological Department, Nairobi, Kenya
- Appendix-II Microscopic Observation of Rocks in Thin Section
- Appendix-III Microscopic Observation of Ore Minerals in Polished Section
- Appendix-IV EPMA Analysis
- Appendix-V X-ray Diffraction Analysis
- Appendix-VI Pb-Pb Age Dating
- Appendix-VII Whole Rock Analysis of Samples from the Mombasa Area
- Appendix-VIII Trend in AFM Diagram, Relation between FeO/MgO Ratio and SiO₂ Content, and Relation between FeO Content and FeO/MgO Ratio in the Igneous Rocks from the Mombasa Area
- Appendix-IX Chemical Analysis of Ore Samples from the Mineral Showings
- Appendix-X Minerals Identified in Pan-concentrated Stream Sediment Samples from the Mombasa Area
- Appendix-XI Geochemical Analysis of Pan-concentrate Samples from the Mombasa Area
- Appendix-XII Geochemical Analysis of Soil Samples from the Mrima Hill-Jombo Hill, Kinangoni, Mkundi, Mkang'ombe and Mangea-Kwa Dadu Areas

**BIBLIOGRAPHY ON GEOLOGY AND MINING
OF THE COAST PROVINCE, KENYA**

DATA BASE : DIALOG

FILE NAME : GEOREF (#89)

DATA INVENTORY: SINCE 1915

01916577 GEOREF NO.: 90-48814 BIBL. INDEX GEOLOGY NO.: 90-50053
TITLE: Present day ore deposition in the geothermal systems of Kenya; I,
The Mwananyamala hot springs, northeast of Jombo Hill, Coast Province
AUTHOR(S): Tole, Mwakio P.
CORPORATE SOURCE: Moi Univ., Sch. Env. Stud., Eldoret, Kenya
SOURCE: Geothermics vol. 19 no. 2 p. 233-239
DATE: 1990
COUNTRY OF PUBLICATION: International
CODEN: GTMCAT ISSN: 0375-6506 REFS.: 5
SUBFILE: B
DOCUMENT TYPE: Serial BIBLIOGRAPHIC LEVEL: Analytic
ILLUSTRATIONS: illus.; 2 tables; sketch maps
LANGUAGE: English
MAJOR DESCRIPTORS: *Kenya; *mineral deposits; *genesis
DESCRIPTORS: economic geology; metal ores; processes; hydrothermal
processes; East Africa; Africa; Jombo Hill; Coast Province; Mwananyamala;
geothermal fields; mineral deposits, genesis; sandstone; clastic rocks;
Permian; Triassic; hot springs; springs; pyrite ores; silver ores; zinc
ores; copper ores; lead ores; iron ores; lanthanum; rare earths; metals;
rare earth deposits
SECTION HEADINGS: 27 (Economic Geology, Metals)

01879054 GEOREF NO.: 90-12118 BIBL. INDEX GEOLOGY NO.: 90-10459
TITLE: Conditions in shallow wells in the south coast region of Kenya
AUTHOR(S): Thambu, G. K.; Goulter, I. C.
CORPORATE SOURCE: Minist. Water Dev., Nairobi, Kenya; Univ. Manit., Dep.
Civ. Eng., Canada
SOURCE: Water International vol. 14 no. 3 p. 112-121
DATE: 1989
COUNTRY OF PUBLICATION: United States
ISSN: 0250-8060 REFS.: 2
SUBFILE: B
DOCUMENT TYPE: Serial BIBLIOGRAPHIC LEVEL: Analytic
ILLUSTRATIONS: illus.; 5 tables; sketch maps
LANGUAGE: English
MAJOR DESCRIPTORS: *Kenya; *ground water
DESCRIPTORS: hydrogeology; surveys; East Africa; Africa; southern Kenya;
water wells; water quality; Kwale; aquifers; pumping
SECTION HEADINGS: 21 (Hydrogeology & Hydrology)

01869941 GEOREF NO.: 90-03491 BIBL. INDEX GEOLOGY NO.: 90-03761
TITLE: Groundwater assessment in sedimentary basins of eastern Kenya,
Africa
AUTHOR(S): Krhoda, George Okoye
CORPORATE SOURCE: Univ. Nairobi, Dep. Geogr., Nairobi, Kenya
MONOGRAPH TITLE: Regional characterization of water quality
EDITOR(S): Ragone, Stephen E. (editor)
CORPORATE SOURCE: U. S. Geol. Surv., Groundwater Contam. Program, Reston,
VA, United States
CONFERENCE TITLE: Regional characterization of water quality
CONFERENCE LOCATION: Baltimore, MD, United States
CONFERENCE DATE: May 1989
SOURCE: IAHS-AISH Publication vol. 182 p. 111-124
DATE: 1989
COUNTRY OF PUBLICATION: International
CODEN: PIHSD9 ISSN: 0144-7815 REFS.: 15
SUBFILE: B
DOCUMENT TYPE: Serial; Conference BIBLIOGRAPHIC LEVEL: Analytic
ILLUSTRATIONS: illus.; 5 tables
LANGUAGE: English
MAJOR DESCRIPTORS: *Kenya; *ground water; *hydrology
DESCRIPTORS: hydrogeology; surveys; East Africa; Africa; eastern Kenya;
sedimentary basins; water resources; possibilities; Tertiary; Quaternary;
aquifers; recharge; water management; economic geology; Tana River; Ewaso
Ngiro River; Daua River; laghas; ephemeral streams; streams; Dua
Limestone; Marchan Series; Merti Beds; upper Pleistocene; Pleistocene;
Mandera; Garissa; Wajiu; Isiolo; Kituu; Kilifi; Lamu; water quality
SECTION HEADINGS: 21 (Hydrogeology & Hydrology)

01789592 GEOREF NO.: 89-02593 BIBL. INDEX GEOLOGY NO.: 89-06120
TITLE: Possible uses of geothermal fluids in Kenya
AUTHOR(S): Kamondo, Wanjie C.
CORPORATE SOURCE: Minist. Energy and Reg. Dev., Nairobi, Kenya
MONOGRAPH TITLE: Small geothermal resources; Part 2, Geothermal projects
in developing countries
AUTHOR(S): Barbier, E.; Dickson, M. H.; Panelli, M.
CORPORATE SOURCE: Int. Inst. Geotherm. Res., Pisa, Italy
CONFERENCE TITLE: 1st UNITAR/UNDP Workshop on Small geothermal resources
CONFERENCE LOCATION: Pisa, Italy
CONFERENCE DATE: May 11-22, 1987
SOURCE: Geothermics vol. 17 no. 2/3 p. 489-501
DATE: 1988
COUNTRY OF PUBLICATION: International
CODEN: GTMCAT ISSN: 0375-6505 REFS.: 5
SUBFILE: B
DOCUMENT TYPE: Serial; Conference BIBLIOGRAPHIC LEVEL: Analytic
ILLUSTRATIONS: 6 tables; sketch maps
LANGUAGE: English
MAJOR DESCRIPTORS: *Kenya
DESCRIPTORS: economic geology; geothermal energy; hydrogeology; thermal
waters; East Africa; Africa; exploration; Jombo Hill Springs; Olkaria;
Eburru; Menengai; Bogoria; Longonot; Suswa; exploitation; Homa Mountain;
Lake Magadi; East African Lakes; chemical composition; hydrochemistry
SECTION HEADINGS: 29 (Economic Geology, Energy Sources); 21
(Hydrogeology & Hydrology)

01675738 GEOREF NO.: 88-68458 BIBL. INDEX GEOLOGY NO.: 88-67548
TITLE: Deposition of metals from the Jombo Hill geothermal field, Coast
Province, Kenya
AUTHOR(S): Tole, Mwakio P.
CORPORATE SOURCE: Univ. Nairobi, Dep. Geol., Nairobi, Kenya
MONOGRAPH TITLE: V. M. Goldschmidt conference; program and abstracts
AUTHOR(S): Anonymous
CONFERENCE TITLE: V. M. Goldschmidt conference
CONFERENCE LOCATION: Baltimore, MD, United States
CONFERENCE DATE: May 11-13, 1988
PUBLISHER: Penn. State Univ., University Park, PA, United States, Geochem.
Soc. Am., United States p. 78
DATE: 1988
COUNTRY OF PUBLICATION: United States
SUBFILE: B
DOCUMENT TYPE: Abstract; Book; Conference BIBLIOGRAPHIC LEVEL: Analytic
LANGUAGE: English
MAJOR DESCRIPTORS: *Kenya
DESCRIPTORS: economic geology; metal ores; East Africa; Africa;
hydrothermal processes; geochemistry; hot springs; springs; Jombo Hill;
geothermal fields; Coast Province; alkalic composition; lead ores; zinc
ores; copper ores; iron ores; silver ores; lanthanum; thermal waters;
ore-forming fluids
SECTION HEADINGS: 27 (Economic Geology, Metals); 02 (Geochemistry)

01665103 GEOREF NO.: 88-57552 BIBL. INDEX GEOLOGY NO.: 88-55998
TITLE: Joint three-dimensional inversion of gravity and magnetic data
from Jombo Hill alkaline complex, Kenya
AUTHOR(S): Dindi, E. W.; Swain, C. J.
CORPORATE SOURCE: Univ. Nairobi, Dep. Geol., Nairobi, Kenya; Univ.
Zimbabwe, Zimbabwe
SOURCE: Journal of the Geological Society of London vol. 145 Part 3 p.
493-504
DATE: 1988
COUNTRY OF PUBLICATION: United Kingdom
CODEN: JGSLAS ISSN: 0016-7649 REFS.: 27
SUBFILE: B
DOCUMENT TYPE: Serial BIBLIOGRAPHIC LEVEL: Analytic
ILLUSTRATIONS: illus.; 3 tables; geol. sketch maps
LANGUAGE: English
MAJOR DESCRIPTORS: *Kenya; *igneous rocks
DESCRIPTORS: petrology; alkalic composition; geophysical surveys; surveys;
East Africa; Africa; gravity surveys; magnetic surveys; Jombo Hill
SECTION HEADINGS: 05 (Petrology, Igneous & Metamorphic); 20
(Geophysics, Applied)

01648043 GEOREF NO.: 88-39641 BIBL. INDEX GEOLOGY NO.: 88-39148
TITLE: Stratigraphy and geodynamics of the Mombasa Basin (Kenya) in
relation to the genesis of the proto-Indian Ocean
AUTHOR(S): Rais-Assa, R.
CORPORATE SOURCE: CNRS, France
SOURCE: Geological Magazine vol. 125 no. 2 p. 141-147
DATE: 1988
COUNTRY OF PUBLICATION: United Kingdom
CODEN: GEMGA4 ISSN: 0016-7568 REFS.: 28
SUBFILE: B
DOCUMENT TYPE: Serial BIBLIOGRAPHIC LEVEL: Analytic
ILLUSTRATIONS: illus.; strat. col.; sects.; geol. sketch maps
LANGUAGE: English
MAJOR DESCRIPTORS: *Kenya
DESCRIPTORS: tectonophysics; plate tectonics; East Africa; Africa; Mombasa
Basin; Indian Ocean; rifting; stratigraphy; Jurassic; Middle Jurassic;
Tethys; sedimentation; Karroo System; rift zones; proto-Indian Ocean
SECTION HEADINGS: 18 (Geophysics, Solid Earth)

01875906 GEOREF NO.: 90-08384 BIBL. INDEX GEOLOGY NO.: 90-11802
TITLE: Ring complexes in Kenya
AUTHOR(S): Ogola, J. S.; Nyambok, I. O.
CORPORATE SOURCE: Univ. Nairobi, Dep. Geol., Nairobi, Kenya
CONFERENCE TITLE: GeoSom 87; geology of Somalia and surrounding regions
CONFERENCE LOCATION: Mogadishu, Somalia
CONFERENCE DATE: Nov. 23-30, 1987
PUBLISHER: Somali Natl. Univ., Mogadishu, Somalia p. 103
DATE: 1987
COUNTRY OF PUBLICATION: Somalia
SUBFILE: B
DOCUMENT TYPE: Abstract; Book; Conference BIBLIOGRAPHIC LEVEL: Analytic
LANGUAGE: English
MAJOR DESCRIPTORS: *Kenya
DESCRIPTORS: economic geology; mineral resources; East Africa; Africa;
petrology; intrusions; ring complexes; carbonatites; mineral exploration;
Rangwa Complex; Homa Complex; North Ruri Complex; South Ruri Complex;
Tinge Complex; Sokoto Complex; Tinderet Complex; Londiani Complex; Jombo
Complex; Mrima Complex; niobium ores; metal ores; phosphate rocks;
chemically precipitated rocks; apatite; phosphates; barite deposits;
pyrochlore; halides; niobates; tantalates; oxides; fluorides;
niobotantalates; laterites; soils; iron ores; manganese ores; aluminum
ores; barium; alkaline earth metals; metals; geothermal energy
SECTION HEADINGS: 26 (Economic Geology, General & Mining)

01630599 GEOREF NO.: 88-21365 BIBL. INDEX GEOLOGY NO.: 88-18162
TITLE: An unusual vanadium-beryl from Kenya
AUTHOR(S): Ghera, A.; Lucchesi, S.
CORPORATE SOURCE: Univ. Roma, Dip. Sci. Terra, I-00186 Rome, Italy
SOURCE: Neues Jahrbuch fuer Mineralogie. Monatshefte vol. 1987 no. 6
p. 263-274
DATE: 1987
COUNTRY OF PUBLICATION: Germany, Federal Republic of
CODEN: NJMMAW ISSN: 0028-3649 REFS.: 33
SUBFILE: B
DOCUMENT TYPE: Serial BIBLIOGRAPHIC LEVEL: Analytic
ILLUSTRATIONS: illus.; 4 anal.; 2 tables; chart
LANGUAGE: English
MAJOR DESCRIPTORS: *Kenya; *minerals; *crystal chemistry
DESCRIPTORS: mineralogy; ring silicates; beryl; vanadium; aluminum;
beryllium; silicates; TGA data; cell dimensions; refractive index;
density; inclusions; phlogopite; mica group; sheet silicates; apatite;
phosphates; talc; quartz; silica minerals; framework silicates; East
Africa; Africa; Taita; minerals; thermal analysis; X-ray data
SECTION HEADINGS: 01 (Mineralogy & Crystallography)

01420557 GEOREF NO.: 85-65707 BIBL. INDEX GEOLOGY NO.: 85-62909
TITLE: Some notes on superficial deposits and recent environmental
changes in the Nyika and coastal zone of Kenya
AUTHOR(S): Kadomura, H.; Hori, N.
CORPORATE SOURCE: Hokkaido Univ., Lab. Fundam. Res., Sapporo, Japan
MONOGRAPH TITLE: Natural and man-induced environmental changes in
tropical Africa; case studies in Cameroon and Kenya; a preliminary report
of the Tropical African Geomorphology and Late Quaternary
Palaeoenvironments Research Project 1982/83
EDITOR(S): Kadomura, H. (editor)
CORPORATE SOURCE: Hokkaido Univ., Lab. Fundam. Res., Sapporo, Japan;
Hiroshima Univ., Dep. Phys. Environ., Japan
SOURCE: Special Publication - Laboratory of Fundamental Research, Hokkaido
University p. 129-144
DATE: 1984
COUNTRY OF PUBLICATION: Japan
REFS.: 21
SUBFILE: B
DOCUMENT TYPE: Serial BIBLIOGRAPHIC LEVEL: Analytic
ILLUSTRATIONS: illus.; sects.; geol. sketch maps
LANGUAGE: English
MAJOR DESCRIPTORS: *Kenya; *geomorphology
DESCRIPTORS: fluvial features; terraces; East Africa; Africa; Holocene;
Quaternary; fluvial environment; Achatina; Taita Hills; erosion features;
gravel; clastic sediments; Nyika; inselbergs; landform evolution; cuirass
; forests; climate
SECTION HEADINGS: 23 (Surficial Geology, Geomorphology)

01420556 GEOREF NO.: 85-65706 BIBL. INDEX GEOLOGY NO.: 85-62958
TITLE: Some aspects of the geomorphic evolution of the Kenya Coast with special reference to the Kambe Limestone rocks of the Kilifi area
AUTHOR(S): Ojany, F. F.
CORPORATE SOURCE: Univ. Nairobi, Dep. Geogr., Nairobi, Kenya
MONOGRAPH TITLE: Natural and man-induced environmental changes in tropical Africa; case studies in Cameroon and Kenya; a preliminary report of the Tropical African Geomorphology and Late Quaternary Palaeoenvironments Research Project 1982/83
EDITOR(S): Kadomura, H. (editor)
CORPORATE SOURCE: Hokkaido Univ., Lab. Fundam. Res., Sapporo, Japan
SOURCE: Special Publication - Laboratory of Fundamental Research, Hokkaido University p. 117-127
DATE: 1984
COUNTRY OF PUBLICATION: Japan
REFS.: 40
SUBFILE: B
DOCUMENT TYPE: Serial BIBLIOGRAPHIC LEVEL: Analytic
ILLUSTRATIONS: illus.; 1 table; geol. sketch maps
LANGUAGE: English
MAJOR DESCRIPTORS: *sedimentation; *geomorphology; *Kenya
DESCRIPTORS: environment; coastal environment; solution features; karst; landform evolution; East Africa; Africa; coastal plains; Kambe Limestone; Kilifi; drainage patterns; Jurassic; transgression; stratigraphy
SECTION HEADINGS: 23 (Surficial Geology, Geomorphology)

01355605 GEOREF NO.: 84-56482 BIBL. INDEX GEOLOGY NO.: 84-50895
MONOGRAPH TITLE: The ammonoid fauna of the Kimmeridgian-Tithonian boundary beds of Mombasa, Kenya
AUTHOR(S): Verma, H. M.; Westermann, G. E. G.
CORPORATE SOURCE: R. Ont. Mus., Dep. Invertebr. Paleontol., Toronto, CAN, Canada; McMaster Univ., Dep. Geol., Canada
SOURCE: Life Sciences Contributions - Royal Ontario Museum vol. 135
DATE: 1984 124 p.
COUNTRY OF PUBLICATION: Canada
ISBN: 0-88854-297-6
CODEN: ROMCAD ISSN: 0384-8159 REFS.: 132
SUBFILE: B
DOCUMENT TYPE: Serial BIBLIOGRAPHIC LEVEL: Monographic
ILLUSTRATIONS: illus.; 19 plates; tables; sects.; strat. cols.; geol. sketch map
LANGUAGE: English
COORDINATES: Latitude: S040500 ; S040500; Longitude: E0394500 ; E0394500
MAJOR DESCRIPTORS: *Kenya; *paleoecology; *Mollusca; *biogeography
DESCRIPTORS: stratigraphy; Jurassic; Ammonoidea; mollusks; East Africa; Africa; Mombasa; boundary; Tetrabranchiata; Cephalopoda; Kimmeridgian; Upper Jurassic; Tithonian; Portlandian; Freretown; faunal studies; assemblages; Changamwe Shales; new taxa; Miritini Shale; paleontology; ammonoids; biostratigraphy
SECTION HEADINGS: 10 (Paleontology, Invertebrate)

01916577 GEOREF NO.: 90-48814 BIBL. INDEX GEOLOGY NO.: 90-50053
TITLE: Present day ore deposition in the geothermal systems of Kenya; I,
The Mwananyamala hot springs, northeast of Jombo Hill, Coast Province
AUTHOR(S): Tole, Mwakio P.
CORPORATE SOURCE: Moi Univ., Sch. Env. Stud., Eldoret, Kenya
SOURCE: Geothermics vol. 19 no. 2 p. 233-239
DATE: 1990
COUNTRY OF PUBLICATION: International
CODEN: GTMCAT ISSN: 0375-6505 REFS.: 5
SUBFILE: B
DOCUMENT TYPE: Serial BIBLIOGRAPHIC LEVEL: Analytic
ILLUSTRATIONS: illus.; 2 tables; sketch maps
LANGUAGE: English
MAJOR DESCRIPTORS: *Kenya; *mineral deposits; *genesis
DESCRIPTORS: economic geology; metal ores; processes; hydrothermal
processes; East Africa; Africa; Jombo Hill; Coast Province; Mwananyamala;
geothermal fields; mineral deposits, genesis; sandstone; clastic rocks;
Permian; Triassic; hot springs; springs; pyrite ores; silver ores; zinc
ores; copper ores; lead ores; iron ores; lanthanum; rare earths; metals;
rare earth deposits
SECTION HEADINGS: 27 (Economic Geology, Metals)

01521751 GEOREF NO.: 86-82445 BIBL. INDEX GEOLOGY NO.: 86-78646
TITLE: The Carboniferous to Tertiary continental sediments of East Kenya
AUTHOR(S): Karanja, F. M.
CORPORATE SOURCE: Minist. Energy, Nairobi, Kenya
MONOGRAPH TITLE: 1st conference on continental sediments in Africa;
proceedings
AUTHOR(S): Anonymous
CONFERENCE TITLE: Conference on continental sediments in Africa; 1
CONFERENCE LOCATION: Cairo, Aswan, Egypt
CONFERENCE DATE: Oct. 16-23, 1983
PUBLISHER: IGCP, Proj. 210
DATE: 1983 15 p.
REFS.: 1 p.
SUBFILE: B
DOCUMENT TYPE: Book; Conference BIBLIOGRAPHIC LEVEL: Analytic
ILLUSTRATIONS: illus.; sketch maps; geol. sketch map; tables
LANGUAGE: English
NOTE: IGCP Project No. 210
MAJOR DESCRIPTORS: *Kenya; *sedimentary rocks
DESCRIPTORS: stratigraphy; Permian; Tertiary; Mesozoic; clastic rocks;
sandstone; East Africa; Africa; terrestrial sedimentation; sedimentary
basins; Karroo System; shale; siltstone; Upper Carboniferous;
Carboniferous; marine sedimentation; review; sedimentation; sedimentary
petrology; processes; IGCP; eastern Kenya; Duruma Group; Mombasa Basin;
Lamu Basin; Mansa Guda Formation; Manderu-Lugh Basin; Marehan Formation;
Anza Basin; Magarini Formation
SECTION HEADINGS: 06 (Petrology, Sedimentary)

01399540 GEOREF NO.: 85-43834 BIBL. INDEX GEOLOGY NO.: 85-37262
TITLE: Berdesinskiite, V SUB 2 TIO SUB 5 , a new mineral from Kenya and
additional data for schreyerite, V SUB 2 Ti SUB 3 O SUB 3
AUTHOR(S): Bernhardt, H. J.; Schmetzer, K.; Medenbach, O.
CORPORATE SOURCE: Univ. Mineral.-Petrogr. Inst., Hamburg 2000, Germany,
Federal Republic of
SOURCE: Neues Jahrbuch fuer Mineralogie, Monatshefte vol. 1983 no. 3
p. 110-118
DATE: 1983
COUNTRY OF PUBLICATION: Germany, Federal Republic of
CODEN: NJMMAW ISSN: 0028-3649 REFS.: 13
SUBFILE: B
DOCUMENT TYPE: Serial BIBLIOGRAPHIC LEVEL: Analytic
ILLUSTRATIONS: illus.; 5 anal.; 7 tables
LANGUAGE: English
COORDINATES: Latitude: S041200 ; S041200; Longitude: E0384000 ; E0384000
MAJOR DESCRIPTORS: *Kenya; *minerals
DESCRIPTORS: mineralogy; oxides; intergrowths; new minerals; vanadium;
titanium; polished sections; ore reflectivity; chemical composition;
electron probe data; cell dimensions; X-ray data; gneisses; Precambrian;
East Africa; Africa; geochemistry; metamorphic rocks; schreyerite;
berdesinskiite; Kwale
SECTION HEADINGS: 01 (Mineralogy & Crystallography)

01372386 GEOREF NO.: 85-15589 BIBL. INDEX GEOLOGY NO.: 85-10970
TITLE: Reefal sediments of the fringing reefs off Mombasa, East Africa
AUTHOR(S): Pereira, C. P. G.
CORPORATE SOURCE: Mem. Univ. Newfoundland, C-CORE, St. John's, NF, Canada
CONFERENCE TITLE: Eleventh international congress on sedimentology
CONFERENCE LOCATION: Hamilton, ON, Canada
CONFERENCE DATE: Aug. 22-27, 1982
SOURCE: International Congress on Sedimentology = Congres International de
Sedimentologie vol. 11 p. 169
DATE: 1982
COUNTRY OF PUBLICATION: International
SUBFILE: B
DOCUMENT TYPE: Abstract; Serial; Conference BIBLIOGRAPHIC LEVEL: Analytic
LANGUAGE: English
MAJOR DESCRIPTORS: *Kenya; *sedimentation; *sediments
DESCRIPTORS: oceanography; reefs; environment; marine sediments; textures;
East Africa; Africa; fringing reefs; Mombasa; grain size; statistical
analysis; corals; foraminifers; microfossils; terrigenous materials;
Halimeda; Codiaceae; Chlorophyceae; Chlorophyta; algae; algal flora
SECTION HEADINGS: 07 (Marine Geology & Oceanography)

01446100 GEOREF NO.: 86-05579 BIBL. INDEX GEOLOGY NO.: 86-01034
TITLE: Comparative geochemistry of nepheline syenites, tinguaite,
phonolites and fenites from southern Portugal and East Africa
AUTHOR(S): Rock, N. M. S.
CORPORATE SOURCE: Inst. Geol. Sci., Edinburgh, United Kingdom
SOURCE: Boletim da Sociedade Geologica de Portugal vol. 22 p. 421-433
DATE: 1981
COUNTRY OF PUBLICATION: Portugal
CODEN: BOORAS ISSN: 0366-2101 REFS.: 72
SUBFILE: B
DOCUMENT TYPE: Serial BIBLIOGRAPHIC LEVEL: Analytic
ILLUSTRATIONS: illus.; 5 tables
LANGUAGE: English SUMMARY LANGUAGE: Portuguese
NOTE: Volume de homenagem ao Professor Doutor Carlos Teixeira
MAJOR DESCRIPTORS: *igneous rocks; *strontium; *isotopes; *oxygen;
*Portugal; *Tanzania; *Kenya; *niobium; *yttrium; *zirconium; *germanium;
*nickel
DESCRIPTORS: geochemistry; trace elements; Sr-87/Sr-86; ratios; O-18/O-16;
Iberian Peninsula; Southern Europe; Europe; southern Portugal; stable
isotopes; nepheline syenite; syenites; tinguaite; phonolites; volcanic
rocks; fenite; metasomatic rocks; Monchique; East Africa; Africa; Mount
Meru; Mount Kenya; Jombo Hill; Ruri Hills; Homa Mountain; Kisingiri
Complex; Oldonyo Dili
SECTION HEADINGS: 05 (Petrology, Igneous & Metamorphic)

01307884 GEOREF NO.: 84-07879 BIBL. INDEX GEOLOGY NO.: 84-07868
TITLE: Studies of shores and shore displacement on the southern coast of
Kenya; especially in Kilifi District
AUTHOR(S): Ase, L. E.
CORPORATE SOURCE: Univ. Stockholm, Dep. Phys. Geogr., Stockholm 11386,
Sweden
SOURCE: Geografiska Annaler. Series A: Physical Geography vol. 63 no.
3-4 p. 303-310
DATE: 1981
COUNTRY OF PUBLICATION: Sweden
CODEN: GAPGAP ISSN: 0435-3676 REFS.: 17
SUBFILE: B
DOCUMENT TYPE: Serial BIBLIOGRAPHIC LEVEL: Analytic
ILLUSTRATIONS: illus.; 2 tables; sketch map
LANGUAGE: English
MAJOR DESCRIPTORS: *Kenya; *geomorphology; *absolute age
DESCRIPTORS: shore features; coastlines; dates; sediments; Holocene;
Quaternary; C-14; fluctuations; marine terraces; uplifts; East Africa;
Africa; stratigraphy; geochronology; neotectonics; Kilifi District
SECTION HEADINGS: 24 (Surficial Geology, Quaternary Geology)

01303867 GEOREF NO.: 84-03814 BIBL. INDEX GEOLOGY NO.: 84-01068
TITLE: A temporal and spatial analysis of foraminiferal diversity from
the fringing reefs off Mombasa, East Africa
AUTHOR(S): Banner, F. T.; Pereira, C. P. G.
CORPORATE SOURCE: Univ. Coll. Swansea, Dep. Oceanogr., Swansea, S. Wales,
United Kingdom
MONOGRAPH TITLE: Microfossils from Recent and fossil shelf seas
EDITOR(S): Neale, J. W. (editor); Brasier, M. D. (editor)
CORPORATE SOURCE: Univ. Hull, United Kingdom
COLLECTION TITLE: British Micropaleontological Society series
CONFERENCE TITLE: British Micropalaeontological Society international
symposium; Microfossils from Recent and fossil shelf seas
CONFERENCE LOCATION: United Kingdom
CONFERENCE DATE: July 1980
PUBLISHER: Ellis Horwood, Chichester, United Kingdom, John Wiley & Sons,
New York, NY, United States p. 350-366
DATE: 1981
COUNTRY OF PUBLICATION: United Kingdom, United States
ISBN: 0-85312-338-1
REFS.: 57
SUBFILE: B
DOCUMENT TYPE: Book BIBLIOGRAPHIC LEVEL: Analytic
ILLUSTRATIONS: illus.; sketch maps
LANGUAGE: English
NOTE: Ellis Horwood series in geology
COORDINATES: Latitude: S040300 ; S035500; Longitude: E0400000 ; E0380000
MAJOR DESCRIPTORS: *foraminifera; *Indian Ocean; *Kenya; *Tanzania
DESCRIPTORS: ecology; assemblages; paleontology; oceanography; continental
shelf; Mombasa; East Africa; Africa; reefs; microfossils; Protista;
Mtwapa Creek; Holocene; Quaternary; sedimentation; biofacies; diversity
SECTION HEADINGS: 07 (Marine Geology & Oceanography); 10 (Paleontology,
Invertebrate)

01282636 GEOREF NO.: 83-44917 BIBL. INDEX GEOLOGY NO.: 83-42233
TITLE: Some interesting corals from the Middle Jurassic Kambe Limestone
in Mombasa-Kwale area, Kenya
AUTHOR(S): Yamagiwa, N.
CORPORATE SOURCE: Osaka Kyoiku Univ., Dep. Earth Sci., Japan
MONOGRAPH TITLE: Sixth preliminary report of African studies, Nagoya
University (Earth Sciences 4), March 1981
AUTHOR(S): Suwa, K.
CORPORATE SOURCE: Nagoya Univ., Japan
PUBLISHER: Nagoya Univ., Assoc. Afr. Stud., Nagoya, Japan p. 159-161
DATE: 1981
COUNTRY OF PUBLICATION: Japan
REFS.: 6
SUBFILE: B
DOCUMENT TYPE: Book BIBLIOGRAPHIC LEVEL: Analytic
ILLUSTRATIONS: illus.; 1 plate
LANGUAGE: English
COORDINATES: Latitude: S044000 ; S034500; Longitude: E0395000 ; E0390000
MAJOR DESCRIPTORS: *Kenya; *Coelenterata
DESCRIPTORS: paleontology; Scleractinia; Jurassic; Anthozoa; new taxa;
Middle Jurassic; East Africa; Africa; Thamnasteria mwachiensis;
Mombasa-Kwale
SECTION HEADINGS: 10 (Paleontology, Invertebrate)

01058719 GEOREF NO.: 81-52752 BIBL. INDEX GEOLOGY NO.: 81-48200
TITLE: The proto-Indian Ocean and probable Paleozoic/Mesozoic triradial
rift system in East Africa
AUTHOR(S): Cannon, R. T.; Simiyu Siambi, W. M. N.; Karanja, F. M.
CORPORATE SOURCE: Mines and Geol. Dep., Nairobi, Kenya
SOURCE: Earth Planet. Sci. Lett. vol. 52 no. 2 p. 419-426
DATE: 1981
COUNTRY OF PUBLICATION: International
CODEN: EPSLA2 ISSN: 0012-821X REFS.: 30
SUBFILE: B
DOCUMENT TYPE: Serial BIBLIOGRAPHIC LEVEL: Analytic
ILLUSTRATIONS: chart; sketch map
LANGUAGE: English
COORDINATES: Latitude: S040000 ; S023000; Longitude: E0400000 ; E0390000
MAJOR DESCRIPTORS: *Kenya; *Africa; *Indian Ocean; *continental drift;
*fish
DESCRIPTORS: stratigraphy; Phanerozoic; tectonophysics; plate tectonics;
Gondwana; biostratigraphy; Triassic; Permian; Kilifi; Karroo System;
Paleozoic; Mesozoic; Jurassic; rifting; geometry; East Africa;
sedimentation; paleocurrents
SECTION HEADINGS: 12 (Stratigraphy, Historical Geology)

01333930 GEOREF NO.: 84-34576 BIBL. INDEX GEOLOGY NO.: 84-35228
TITLE: Industrial minerals development in Kenya
AUTHOR(S): Mason, J. E.; Theuri, F. G.
CORPORATE SOURCE: Mines and Geol. Dep., Nairobi, Kenya
MONOGRAPH TITLE: Fourth "Industrial Minerals" international congress;
abstracts
AUTHOR(S): Anonymous
CONFERENCE TITLE: Fourth "Industrial Minerals" international congress
CONFERENCE LOCATION: Atlanta, GA, United States
CONFERENCE DATE: May 27-May 30, 1980
SOURCE: Industrial Minerals vol. 152 p. 33
DATE: 1980
COUNTRY OF PUBLICATION: United Kingdom
CODEN: IMINBG ISSN: 0019-8544
SUBFILE: B
DOCUMENT TYPE: Abstract; Serial; Conference BIBLIOGRAPHIC LEVEL: Analytic
LANGUAGE: English
MAJOR DESCRIPTORS: *Kenya
DESCRIPTORS: economic geology; industrial minerals; Africa; East Africa;
Mombasa; export; cement materials; construction materials; fluorspar;
sodium carbonate; economics; gypsum deposits
SECTION HEADINGS: 28 (Economic Geology, Nonmetals)